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Errata

Title & Document Type: 8672A Synthesized Signal Generator Operating and Service Manual

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HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

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Agilent Technologies

OPERATING AND SERVICE MANUAL

HP 8672A
SYNTHESIZED SIGNAL GENERATOR

(Including Options 001, 002, 003, 004, 005, 034, and 038)

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed 2229A.

With changes described in Section VII, this manual also applies to instruments with serial numbers prefixed 1610A, 1701A thru 1708A, 1711A, 1712A, 1719A, 1725A, 1731A thru 1733A, 1801A, 1816A, 1821A, 1822A, 1831A, 1833A, 1834A, 1841A, 1845A, 1905A, 1906A, 1913A, 1914A, 1930A, 1940A, 2002A, 2005A thru 2008A, 2010A, 2012A, 2014A, 2016A, 2017A, 2018A, 2019A, 2020A, 2034A, 2037A, 2039A, 2040A, 2101A, 2102A, 2103A, 2104A, 2105A, 2114A, 2115A, 2126A, 2132A, 2133A, 2207A, 2208A, 2210A, 2211A, 2220A, and 2221A.

For additional important information about serial numbers, see INSTRUMENTS COVERED BY MANUAL in Section I.

HEWLETT PACKARD

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Operating Manual Part No. 08672-90087
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SAFETY CONSIDERATIONS

GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed.

SAFETY EARTH GROUND

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

WARNINGS

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection.) In addition, verify that a common ground exists between the unit under test and this instrument prior to energizing either unit.

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to neutral (that is, the grounded side of the mains supply).

Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.

Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuseholders.

SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (see Table of Contents for page references).



Indicates hazardous voltages.

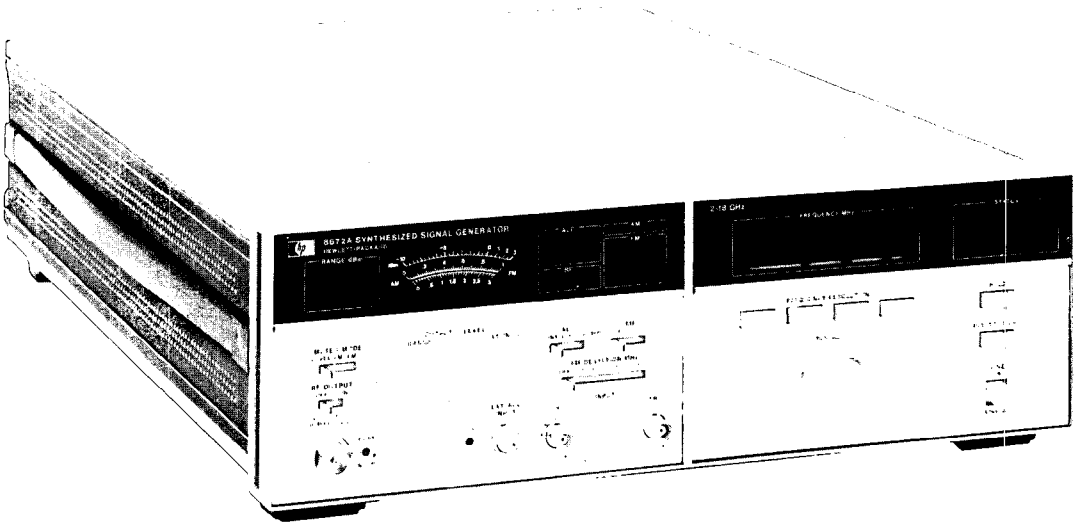


Indicates earth (ground) terminal.

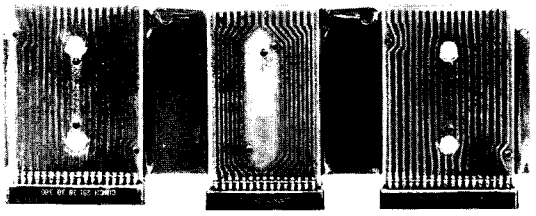
WARNING The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

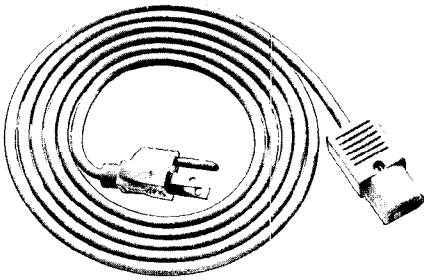
MODEL 8672A



EXTENDER BOARDS



LINE POWER CABLE



FUSE



NOTE: See ACCESORIES SUPPLIED in Section I for more details.

Figure 1-1. HP Model 8672A and Accessories Supplied.

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This manual contains information pertinent to installation, operation, testing, adjusting, and servicing the Hewlett-Packard Model 8672A Synthesized Signal Generator. The Model 8672A will generally be referred to as the Synthesizer throughout this manual.

1-3. Information pertaining to the Hewlett-Packard Interface Bus (HP-IB) as it relates to the Synthesizer is found in various sections of this manual. Section VIII contains a diagnostic program for checkout of HP-IB functions. A remote operator's check is also found in Section VIII.

1-4. Figure 1-1 shows the Synthesizer with all supplied accessories.

1-5. Packaged with this manual is an Operating Information Supplement. This is simply a copy of the first three sections of this manual. This supplement should stay with the instrument for use by the operator. Additional copies may be ordered separately through your nearest Hewlett-Packard office. The part number is listed on the title page of this manual.

1-6. On the title page of this manual, below the manual part number, is a "Microfiche" part number. This number may be used to order 100 x 150 mm (4 x 6-inch) microfilm transparencies of the manual. Each microfiche contains up to 96 photo-duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as all pertinent Service Notes.

1-7. SPECIFICATIONS

1-8. Instrument specifications are listed in Table 1-1. These specifications are the performance standards, or limits against which the instrument may be tested.

1-9. SAFETY CONSIDERATIONS

1-10. This product is a Safety Class I instrument (provided with a protective earth terminal). The instrument and manual should be reviewed for safety markings and instructions before operation.

1-11. The Synthesizer and all related documentation must be reviewed for familiarization with safety markings and instructions before operation. Refer to the Safety Considerations page found at the beginning of this manual for a summary of the safety information.

1-12. Safety information pertinent to the task at hand (installation, operation, performance testing, adjustments, or service) is found throughout this manual.

1-13. INSTRUMENTS COVERED BY MANUAL

1-14. Options. Electrical options 001, 002, 003, 004, 005 and various mechanical options are documented in this manual. The differences are noted under the appropriate paragraph such as Options in Section I, the Replaceable Parts List and the schematic diagrams.

1-15. Serial Numbers. Attached to this instrument is a serial number plate. The serial number is in the form 1234A00123. The first four digits and the letter comprise the serial prefix. The last five digits form the sequential suffix that is unique to each instrument. The contents of this manual apply directly to instruments having the same serial number prefix(es) as listed under SERIAL NUMBERS on the title page.

1-16. For information concerning a serial number prefix not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

1-17. MANUAL CHANGE SUPPLEMENTS

1-18. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. This unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for this instrument is supplied with a yellow Manual Change supplement that contains "change information" that documents the differences.

1-19. In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to this manual's print date and part number, both of which appear on the title page. Complimentary copies of the supplement are available from Hewlett-Packard.

Table 1-1. Specifications (1 of 4)

SPECIFICATIONS

FREQUENCY CHARACTERISTICS

Range: 2.0 to 18.0 GHz (overrange to 18.599 997 GHz)

Resolution: 1 kHz, 2.0—6.199 999 GHz
2 kHz, 6.2—12.399 998 GHz
3 kHz, 12.400 002—18.0 GHz

Time Base:

Internal: 10 MHz; Aging Rate is $< 5 \times 10^{-10}$/day after 30 day warmup[1,2].

External: 5 or 10 MHz; 0.1 to 1 Vrms nominal into 50 ohms[3].

Reference Outputs: 10 MHz and 100 MHz, 0.2 Vrms nominal into 50 ohms.

Frequency Accuracy: same as time base[2].

Switching Time (CW and AM modes): < 15 ms to be within 1 kHz for frequencies from 2—6.2 GHz, within 2 kHz from 6.2 to 12.4 GHz, and within 3 kHz from 12.4—18 GHz; < 15 ms to be within 3 dB of final amplitude level for any frequency change on the same band.

SPECTRAL PURITY CHARACTERISTICS

Harmonics (up to 18 GHz): <−25 dBc.

Sub-harmonics and Multiplies (up to 18 GHz): <−25 dBc.

Spurious (CW and AM modes[4]):

Non-harmonically related: <−70 dBc, 2.0—6.2 GHz
<−64 dBc, 6.2—12.4 GHz
<−60 dBc, 12.4—18.0 GHz

Power Line Related and Spurious: (Due to fan rotation within 5 Hz below line frequency and multiples):

Except Option 003 Instruments (400 Hz operation)

Carrier(F_C) Frequency Range (GHz)	Power Line Related and Spurious Levels At Frequency Offset (f_0) From Carrier (F_C)		
	f_0<300 Hz	300 Hz≤f_0≤1 kHz	f_0 >1 kHz
2.0—6.2	−50 dBc	−60 dBc	−65 dBc
6.2—12.4	−44 dBc	−54 dBc	−59 dBc
12.4—18.0	−40 dBc	−50 dBc	−55 dBc

Power Line Related and Spurious: (Due to fan rotation; within 5 Hz below line frequency and multiples):

Option 003 only (400 Hz operation)

Carrier (F_C) Frequency Range (GHz)	Power Line Related and Spurious Levels at Frequency Offset (f_0) from Carrier (F_C)		
	$f_0 < 2$ kHz	2 kHz≤f_0≤8 kHz	f_0>8 kHz
2.0—6.2	−40 dBc	−50 dBc	−65 dBc
6.2—12.4	−34 dBc	−44 dBc	−59 dBc
12.4—18	−30 dBc	−40 dBc	−55 dBc

Single-Sideband Phase Noise (1 Hz BW, CW mode):

Frequency Range (GHz)	SSB Phase Noise Ratio (in 1 Hz BW, CW mode) at Specified Offset Frequency*				
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz
2.0—6.2	−58dB	−70dB	−78dB	−86dB	−110dB
6.2—12.4	−52dB	−64dB	−72dB	−80dB	−104dB
12.4—18.0	−48dB	−60dB	−68dB	−76dB	−100dB

*dB referenced to carrier (dBc)

[1] Reference is kept at operating temperature in STAND-BY mode with the instrument connected to Mains power. For instruments disconnected from Mains power less than 24 hours, the aging rate is $< 5 \times 10^{-10}$/day after a 24 hour warmup.

[2] Overall accuracy of the internal reference oscillator is a function of time base calibration ± aging rate ± temperature effects ± line voltage effects. Typical temperature and line voltage effects are $< 1 \times 10^{-10}$/°C and $< 5 \times 10^{-10}$/+5% −10% line voltage change.

[3] Stability and spectral purity will be partially determined by characteristics of external reference oscillator.

[4] In AM mode, external FM signals at rates <100 kHz must be disconnected. In CW mode, external AM and FM signals at rates <100 kHz must be disconnected.

Table 1-1. Specifications (2 of 4)

RF OUTPUT CHARACTERISTICS

Level: +3 to −120 dBm, +15°C to +35°C [5, 6, 12]

Total Indicated Meter Accuracy (+15°C to +35°C): [7, 8, 9]

Frequency Range (GHz)	Indicated Meter Accuracy at OUTPUT LEVEL RANGE Switch Setting			
	0 dBm (No Attenuation)	−10 dBm	−20 dBm	−30 dBm and Below
2.0—6.2	±1.75 dB	±2.25 dB	±2.45 dB	±1.75 dB ±0.3 dB/10 dB step below 0 dBm range
6.2—12.4	±2.0 dB	±2.5 dB	±2.7 dB	±2.0 dB ±0.3 dB/10 dB step below 0 dBm range
12.4—18.0	±2.25 dB	±2.85 dB	±3.05 dB	±2.25 dB ±0.4 dB/10 dB step below 0 dBm range

Remote Programming Accuracy [7, 8]: 0.75 dB better than meter accuracy indicated above.

Flatness (0 dBm range, +15°C to +35°C) [7,9]: ±0.75 dB, 2.0—6.2 GHz
±1.00 dB, 2.0—12.4 GHz
±1.25 dB, 2.0—18.0 GHz

Output Level Switching Time: < 20 ms [7,10].

Impedance: 50 ohms

Source SWR: [11] Typically <2.0

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[5] Additional power available on +10 dBm range (overrange), but for power settings above the maximum specified level, spurious oscillations may degrade performance.

[6] For Option 001, 034 and 038 instruments, RF output level specification changes to +5 to −10 dBm from +15 to +35°C; for Option 004, +2.0 dBm max.; Option 005, +4 to −10 dBm from +15 to +35 °C? for Option 008, +8 dBm to −120 dBm from +15°C to +35°C. The RF output level also changes when options are combined. When Option 001, 034 or 038 is combined with Option 008, the RF output level specification is +10 to −10 dBm. When Options 004 and 008 are combined, the RF output level specification is +7 dBm to −120 dBm. However, when Options 005 and 008 are combined, the RF output level specification is +9 dBm to −10 dBm.

[7] Applies for internal leveling only.

[8] Specification includes allowances for meter accuracy (typically ±0.50 dB), detector linearity, temperature, flatness, attenuator accuracy and measurement uncertainty. All but the attenuator accuracy and the measurement error can be calibrated out with a power meter at fixed vernier settings.

[9] For Option 004 and 005 instruments, total indicated meter accuracy and flatness are degraded by an additional ± 0.25 dB.

[10] Typically < 10 ms for any change on same output level range.

[11] On the 0 dBm and −10 dBm output level range, characteristic applies only at the RF output frequency.

[12] For power settings > 0 dBm and changes in frequency setting from < 10 GHz to > 16 GHz, a setting period may be required for the output power to stabilize at the set level.

Table 1-1. Specifications (3 of 4)

AMPLITUDE MODULATION CHARACTERISTICS

Depth (for meter readings 0 dBm and below, +15°C to +35°C):[12]
0—75% from 2.0—6.2 GHz
0—60% from 6.2—12.4 GHz
0—50% from 12.4—18.0 GHz

Rates (3 dB bandwidth):
10 Hz—100 kHz.

Frequency Response (100 Hz—10 kHz rates):
± 0.25 dB.

Sensitivity (percent AM per Vpk):
30%/V and 100%/V ranges. Maximum input 1 Vpk into 600 ohms nominal.[13]

Distortion (for rates less than 10 kHz and meter readings 0 dB and below, +15°C to +35°C):
<3% at 30% depth
<4% at 50% depth
<5% at 75% depth

Indicated Meter Accuracy (100 Hz—10 kHz rates): ±5% of range.

Accuracy Relative to EXT AM Input Level (100 Hz—10 kHz rates): ±10% of range.

Incidental ϕM (Rates ≤ 10 kHz, 30% Depth):
< 0.7 Rad, 2.0—6.2 GHz
< 1.8 Rad, 6.2—12.4 GHz
< 1.2 Rad, 12.4—18.0 GHz

Incidental FM:
Incidental ϕM x f_{mod}.

FREQUENCY MODULATION CHARACTERISTICS

Peak Deviation (maximum): The smaller of 10 MHz or f_{mod} x 5, 2.0—6.2GHz; 10 MHz or f_{mod} x 10, 6.2—12.4 GHz; 10 MHz or f_{mod} x 15, 12.4—18.0 GHz

Rates (3 dB bandwidth typical): 30, 100 kHz/V ranges, 50 Hz to 10 MHz; 300 kHz/V and 1, 3, 10 MHz/V ranges, 1 kHz to 10 MHz.

Frequency Response (relative to 100 kHz rate):
±2.0 dB, 100 Hz—3 MHz, 30 and 100 kHz/V ranges.
±2.0 dB, 3 kHz—3 MHz, 300 kHz/V and 1, 3, 10 MHz/V ranges.

Sensitivity (peak deviation per Vpk):
30, 100, 300 kHz/V and 1, 3, 10 MHz/V ranges, maximum input 1 Vpk into 50 ohms nominal.[14]

Harmonic and Non-Harmonic Distortion:[15] <12% for rates < 3 kHz, decreasing linearly with frequency to 5% at 20 kHz rate. < 5% for 20 to 100 kHz rates.

Residual FM in FM and CW Modes (noise and power line related)[16]:

Mode/Range	Residual FM in Post Detection Bandwidth	
	300—3 kHz	50 Hz—15 kHz
CW, 30, 100 kHz/V	16 Hz—rms	80 Hz—rms
300 kHz/V, 1, 3, 10 MHz/V	20 Hz—rms	100 Hz—rms

Indicated Meter Accuracy (at 100 kHz rate):[17]
±10% of full scale at +15°C to +35°C.
±15% of full scale at 0 to +55°C.

Accuracy Relative to External Input Level (at 100 kHz rate):[17] ±7% of range at +15°C to +35°C
±10% of range at 0 to +55°C.

Incidental AM (rates ≤100 kHz, peak deviation ≤1 MHz):
< 10%.

---

[12] The meter reading of output power level when using AM is carrier level only (i.e., does NOT include power in AM sidebands).

[13] 1.0V peak gives maximum depth on each range. AM depth is linearly controlled by varying input level between 0 and 1 Vpk.

[14] 1 Vpk gives maximum deviation on each range. Peak deviation is linearly controlled by varying input level between 0 and 1 Vpk.

[15] For certain FM modulating frequencies, spurious FM signals (non-harmonic distortion) may occur. After demodulation in an external FM discriminator, the contribution to distortion of these spurious FM signals is typically less than 0.6%.

[16] Residual FM doubles in 6.2—12.4 GHz range; triples in 12.4—18.0 GHz range.

[17] For FM rates other than 100 kHz, add FM frequency response specification.

Table 1-1. Specifications (4 of 4)

REMOTE PROGRAMMING CHARACTERISTICS

Frequency: Programmable over full range (up to 18.599 997 GHz) with same resolution as in manual mode.

Output Level: Programmable in 1 dB steps, +3 to −120 dBm, plus the 10 dB of overrange.

AM Modulation: OFF, 30%/Vpk, and 100%/Vpk ranges.

FM Modulation: OFF; 30, 100, 300 kHz/Vpk; 1, 3, 10 MHz/Vpk ranges.

Other: RF ON, RF OFF, ALC INT, ALC EXT XTAL, ALC EXT, PWR MTR.

Programming Format: HP-IB (Hewlett-Packard Interface Bus).

GENERAL CHARACTERISTICS

Operating Temperature Range: 0° to 55°C.

Leakage: Meets radiated and conducted limits of MIL-I-6181D.

Power: 100, 120, 220, or 240V, +5%, −10% 48−66 Hz 300 VA maximum.

Net Weight: 27.2 kg (60 lb).

Dimensions: 600 mmD x 425 mmW x 133 mmH (23-5/8" x 16-3/4" x 5-1/4").

1-20. DESCRIPTION

1-21. The HP Model 8672A Synthesized Signal Generator has a frequency range of 2000 to 18 000 MHz. The output is leveled and calibrated from +3 to −120 dBm. AM and/or FM modulation modes can be selected. The frequency, output level, modulation modes, and most other modes or functions can be remotely controlled using the HP-IB programming format.

1-22. Frequency

1-23. Frequencies from 2000 to 18 000 MHz (overrange to 18 599.997 MHz) can be tuned from the front panel. Minimum resolution is 1 kHz from 2000 to 6199.999 MHz, 2 kHz from 6200 to 12 399.998 MHz and 3 kHz from 12 400.002 to 18 000 MHz. Tuning resolutions of 100 MHz, 1 MHz, 10 kHz, or 1 kHz minimum are selected by front panel pushbuttons.

1-24. Frequency stability is dependent on the time base, either an internal or external oscillator. The internal crystal oscillator operates at 10 MHz while an external oscillator must operate at 5 or 10 MHz. The heart of the Synthesizer, a YIG tuned oscillator (YTO), is phase-locked to the time base oscillator.

1-25. Output Level

1-26. The output of the Synthesizer is exceptionally flat due to the action of the internal automatic leveling control (ALC) loop. The accuracy of the total indicated output level (the sum of the front panel meter reading and the attenuator range) is increased.

1-27. The OUTPUT LEVEL VERNIER controls the output level as indicated by the front panel meter (+3 to −10 dB). The OUTPUT LEVEL RANGE switch sets the attenuation of the output level in twelve 10 dB steps (0 to −110 dBm). The +10 dBm range (overrange) is also controlled by the OUTPUT LEVEL RANGE switch.

1-28. Modulation Modes

1-29. Both amplitude and frequency modulation capabilities are available in the instrument using either front panel switches or remote programming. External drive signals are used for both AM and FM operation. AM depth and FM deviation are linear with the applied external voltage. Full scale modulation is attained with 1.0 V-peak.

1-30. Two ranges of AM depth are selectable either from the front panel or via remote programming. The front panel meter can be used to set the AM depths of up to 75% between 2000 MHz and 6200 MHz, up to 60% between 6200 MHz and 12 400 MHz, and 50% between 12 400 MHz and 18 000 MHz. Amplitude modulation can be performed at any frequency between 10 Hz and 100 kHz.

1-31. FM peak deviation can be set using the front panel meter. At output frequencies below 6200 MHz, peak deviation is limited to 10 MHz or five times the modulation frequency, whichever is lower. From 6200 to 12 400 MHz, peak deviation is limited to the lesser of 10 MHz or ten times the modulation frequency; from 12 400 to 18 000 MHz the lesser of 10 MHz or fifteen times the modulation frequency. Usable modulation rates fall between 50 Hz and 10 MHz. Six ranges of deviation sensitivity are selectable either by the front panel switches or via remote programming.

1-32. Miscellaneous Outputs and Indicators

1-33. The front panel meter indicates output level, AM depth, or FM peak deviation. The meter mode is selected by a front panel switch.

1-34. External leveling is selected by a front panel switch. A power meter or crystal detector may be used as the leveling loop detector.

1-35. Phase-locked reference outputs of 10 and 100 MHz are available on the rear panel.

1-36. Six front panel status indicators make the Synthesizer operation easier and aid in reducing possible operator error.

1-37. Remote Operation

1-38. The Synthesizer is fully programmable via the Hewlett-Packard Interface Bus. In the remote mode all front panel controls are disabled except the LINE and METER MODE switches.

1-39. The output level is selected in 1 dB steps. The programmed output level is more accurate than can be obtained in the local mode. This occurs because the output level is set by programming rather than being set by monitoring the meter reading. The meter reading may be in error due to meter nonlinearity.

1-40. OPTIONS

1-41. Electrical Options

1-42. Options 001 and 005. Both of these options omit the internal RF step attenuator and have only two positions on the OUTPUT LEVEL RANGE switch. Option 001's output level specification is +5 to −10 dBm. Option 005 has a rear panel RF OUTPUT connector; its output level specification is +4 to −10 dBm, and its total indicated level accuracy and flatness specifications are degraded by ±0.25 dB.

1-43. Option 002. The internal 10 MHz crystal reference is omitted.

1-44. Option 003. A special fan allows operation from 400 Hz power Mains.

1-45. Option 004. The Synthesizer's RF output connector is located on the rear panel. Maximum output power is +2.0 dBm. Total indicated level accuracy and flatness is degraded by ±0.25 dB.

1-46. Options 034 and 038. Both of these options omit the internal RF step attenuator; have specified RF output between +5 and −10 dBm; have an additional connector on the rear panel for controlling an 86720A Frequency Extension Unit, and can display the entire frequency range of an 8672S system (that is, 100 MHz to 18 GHz). The Option 038 has only two positions on the OUTPUT LEVEL RANGE switch.

1-47. Mechanical Options

1-48. The following options may have been ordered and received with the Synthesizer. If they were not received with the original shipment and are now required, they must be ordered from your nearest Hewlett-Packard office using the part number included in each of the following paragraphs.

1-49. Chassis Slide Mount Kit. This kit is extremely useful when the Synthesizer is rack mounted. Access to internal circuits and components, or the rear panel is possible without removing the Synthesizer from the rack. Order HP part number 1494-0017. When this kit comes with the Synthesizer, it is identified as Option 006. If the instrument rack mounting slides are to be mounted in a standard EIA rack, then an adapter (HP Part No. 1494-0023) is needed. The slides without the adapter can be directly mounted in the HP system enclosures.

1-50. Front Handle Kit. Ease of handling is increased with the front panel handles. Order HP part number 5061-0089.

1-51. Rack Flange Kit. The Synthesizer can be solidly mounted to the instrument rack using this kit. Order HP part number 5061-0077.

1-52. Rack Flange and Front Handle Combination Kit. This kit is not a front handle kit and rack flange kit packaged together. The combination is made up of a unique part which includes both functions. Order HP part number 5061-0083.

1-53. COMPATIBILITY

1-54. The Synthesizer is compatible with HP-IB as indicated by the following code: AH1, CØ, DC1, DTØ, L4, LEØ, PP2, RL2, SH1, SR1, T6 and TEØ. An explanation of the compatibility code may be

found in the IEEE Standard 488-1975, "IEEE Standard Digital Interface for Programmable Instrumentation."

1-55. For more detailed information relating to programmable control of the Synthesizer, refer to Section III in this manual.

1-56. SELECTING THE HP-IB ADDRESS

1-57. The HP-IB address switches are located within the Synthesizer. The switches represent a two-digit octal number. This number corresponds to talk and listen address characters which an HP-IB controller is capable of generating. A table in Section II shows all HP-IB talk and listen addresses. Refer to the paragraph entitled HP-IB Address and Parallel Poll Response Selection in Section II.

1-58. ACCESSORIES SUPPLIED

1-59. The accessories supplied with the Synthesizer are shown in Figure 1-1.

a. The line power cable may be supplied in several combinations of plugs. Refer to Power Cables in Section II.

b. Fuses with a 3.0A rating for 100/120 Vac (HP 2110-0003) and a 1.5A rating for 220/240 Vac (HP 2110-0043) are supplied. One fuse is factory installed according to the voltage available in the country of destination. Refer to Line Voltage Selection in Section II.

c. There are four extender boards supplied which aid in performance testing, adjusting, and troubleshooting the instrument.

1. One 30-pin (15 x 2) extender board, HP part number 08672-60117.

2. Two 36-pin (18 x 2) extender boards, HP part number 08672-60020.

3. One 3-section, 30-pins (15 x 2) per section, extender board, HP part number 08672-60016 (for use in the A2 Assembly).

1-60. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-61. For Option 002 instruments which lack an internal frequency standard, an external reference must be used. The performance of the external reference should at least match the specifications and, in particular, the frequency accuracy[1] and spectral purity of the HP Model 10544C Crystal Oscillator. When using an external oscillator, microphonics or line related spurious signals may increase.

1-62. An external signal source is required if amplitude or frequency modulation is desired. For AM, the source should have a variable output of 0 to 1 Vpk into 600 ohms, modulation rates up to 100 kHz, and distortion of <1%. For FM, the source should have a variable output of 0 to 1 Vpk into 50 ohms, modulation rates up to 10 MHz, and distortion of <1%. The HP 651B and 654A test oscillators are adequate for modulating the Synthesizer and meet the stated requirements.

1-63. A remotely programmable audio source would be convenient for full remote control of modulation levels and rates.

1-64. EQUIPMENT AVAILABLE

1-65. The Synthesizer has an HP-IB interface and can be used with any HP-IB compatible computing controller or computer for automatic systems applications.

1-66. The 11712A Support Kit is available to aid the user in maintaining and servicing the Synthesizer. It consists of cables, adaptors, terminations, prerecorded programs, extender boards and a test extender board.

1-67. The prerecorded programs are on tape cassettes and are for use with the HP 9830A and HP 9825A Computing Controllers. The Output Register Test Board is intended to aid in troubleshooting the frequency control circuits.

1-68. Refer to the 11712A Support Kit operating manual for additional information. It may be ordered through your nearest Hewlett-Packard office.

1-69. RECOMMENDED TEST EQUIPMENT

1-70. Table 1-2 lists the test equipment and accessories recommended for use in testing, adjusting, and servicing the Synthesizer. If any of the recommended equipment is unavailable, instruments with equivalent minimum specifications may be used.

[1] Frequency Accuracy: needed 1 ppm; minimum requirement 10 ppm.

Table 1-2. Recommended Test Equipment (1 of 3)

Instrument	Critical Specifications	Recommended Model	Use*
Adapter (2 required)	APC-7 to Type-N Male Frequency Range: 2—18 GHz	HP 11525A	P
Amplifier, 40 dB	Frequency Range, 5 Hz to 10 kHz Gain: 40 dB (x100) into one megohm	HP 8447A Opt. 001	P
Analyzer, Audio	Distortion measurement at audio rate from 1 kHz to 100 kHz, residual distortion <0.1%	HP 8903A	P
Analyzer, Logic State	8-bit display Triggerable	HP 1600A	T
Analyzer, Modulation	Residual FM at 20 MHz in a 3 kHz post detection bandwidth <2 Hz FM demodulation capability at 20 MHz and 100 MHz. Able to read both peak and average deviation	HP 8901A	P
Analyzer, Spectrum	Frequency response: to 40 kHz Bandwidth: 1 Hz minimum Frequency Span Per Division: 5Hz minimum Amplitude Range: 0 to —70 dB	HP 3580A	P
Analyzer, Spectrum	Frequency Range: 10 kHz—100 MHz Frequency Span: 0.1—100 MHz Resolution Bandwidth: 30 Hz—300 kHz Amplitude Range: +10 to —90 dBm Vertical Sensitivity: 2 dB per division minimum	HP 8553B/8552B/141T	A,T
	Frequency Range: 1 kHz—200 kHz Frequency Span: 0—50 kHz	HP 8556A	P,A,T
	Frequency Range: 2—18 GHz Frequency Span: 50 kHz to 200 MHz per division Resolution Bandwidth: 30 Hz—300 kHz Amplitude Range: +10 to —90 dBm Vertical Sensitivity: 2 dB per division minimun	HP 8565A	P,A,T
Attenuator	3 dB 10 dB	HP 8491A, Opt.003 HP 8491A, Opt.010	A P
Cable, Semi-rigid	50Ω 3.6 mm (0.141") diameter with compatible SMA connector	Locally fabricated	P
Cable, HP-IB Interconnect	HP-IB Compatible	HP 10833A	P,A,T
Cable, Special Interconnect	Special (see Figure 1-3)	Locally fabricated	A

*P = Performance Testing, A = Adjustments, T = Troubleshooting

Table 1-2. Recommended Test Equipment (2 of 3)

Instrument	Critical Specifications	Recommended Model	Use*
Controller, HP-IB	HP-IB Compatible	HP 9830A or HP 9825A with HP 11712A Support Kit	P,A,T
Counter, Frequency	Range: 20 kHz to 18 GHz range Resolution: 10 Hz	HP 5340A	P,A,T
Coupler, Directional	24 dB directivity minimun, 2 to 18 GHz	HP 11691D	P,T
Current Probe, AC	Frequency Range: 2—35 MHz	HP 1110B	A
Detector, Crystal	Type-N connector, 2—18 GHz range	HP 8470B, Opt. 012	P,A,T
Filter, Low Pass	15 kHz Special (see Figure 1-2)	Locally fabricated	P
Mixer, Double Balanced	2—18 GHz response	RHG DM1-18	P,A
Oscillator, Sweep	Center Frequency: 150—200 MHz Center Frequency Resolution: 0.1 MHz Sweep Range: 10 and 200 MHz	HP 86220A/8620C	A
Oscillator, Test	Level: 1Vpk minimum Range: 10 kHz to 1 MHz	HP 651B	P,A,T
Oscilloscope	Vertical Amplifier response: Dc to 50 MHz Vertical Amplifier Sensitivity: 0.05 to 0.5V/division Dual Channel External Triggering Horizontal Input Storage	HP 180C/1801A/1821A HP 181A	P,A,T P
Divide-by-10 Probe	Compatible with 1801A	HP 10004D	A
Pads, Foam (2 required)	43 x 58 cm (17 x 23 inches) 5 cm (2 in.) thick		P
Power Meter	Frequency Range: 2—18 GHz Accuracy: ±0.2 dB Range: ±17 to —25 dBm into 50 ohms Range: —20 dBm to —60 dBm into 50 ohms	HP 436A/8481A HP 8484A	P,A,T P

*P = Performance Testing, A = Adjustments, T = Troubleshooting

Table 1-2. Recommended Test Equipment (3 of 3)

Instrument	Critical Specifications	Recommended Model	Use*
Short	APC-7	HP 11565A	P
Signal Generator, Synthesized	RF Source: 2—18 GHz phase locked Frequency Resolution: 1 kHz Maximum Output: +7 dBm minimum at specific frequencies	HP 8672A	P,A
Signal Generator, RF	−5 to −20 dBm at 240 MHz	HP 8654A	A
Standard, Frequency	Long Term Stability: $<1 \times 10^{-10}$/24 hours	HP 5065A	P
Supply, Power	0 to −40 Vdc	HP 6202B	A
Termination	50Ω; BNC male	HP 11593A	P,A,T
Termination	600Ω connectors: BNC male/BNC female	HP 11095A	P,A,T
Termination	50Ω; APC-7	HP 909A Opt. 12	P
Voltmeter, Digital	Range: +22 to −40 Vdc; 0 to 1 Vrms Resolution: 0.001 Vdc; 1 μVrms Frequency Response: 100 kHz minimum	HP 3455A	P,A,T
Voltmeter, AC	Range: +10 to −60 dB Frequency Response: 1—50 kHz	HP 400E	A,T
Voltmeter, RMS	Range: to 100 mVrms Resolution: 0.01 mVrms Frequency Response: to 10 kHz	HP 3400A	P

*P = Performance Testing, A = Adjustments, T = Troubleshooting

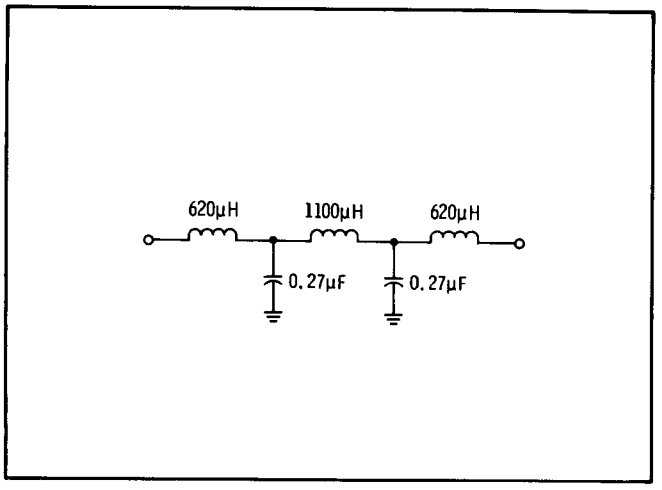


Figure 1-2. 15 kHz Low Pass Filter

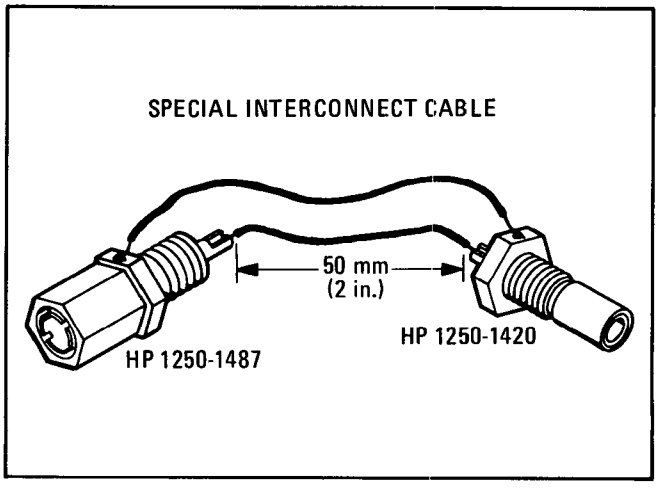


Figure 1-3. Special Interconnect Cable

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section provides the information needed to install the Synthesizer. Included is information pertinent to initial inspection, power requirements, line voltage selection, power cables, interconnection, environment, instrument mounting, storage and shipment.

2-3. INITIAL INSPECTION

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, meters).

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1. Procedures for checking electrical performance are given in Section IV. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the carrier's inspection.

2-5. PREPARATION FOR USE

2-6. Power Requirements

2-7. The Synthesizer requires a power source of 100, 120, 220, or 240 Vac, +5% to −10%, 48 to 60 Hz single phase (for Option 003 instruments, 400 Hz single phase and 120 Vac, +5%, −10% only). Power consumption is approximately 300 volt-amperes.

WARNINGS

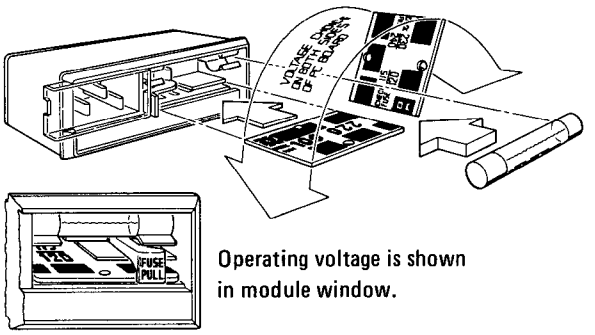
This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer for voltage reduction, make sure the common terminal is connected to the earthed pole of the power source.

2-8. Line Voltage and Fuse Selection

CAUTION

BEFORE PLUGGING THIS INSTRUMENT into the Mains (line) voltage, be sure the correct voltage and fuse have been selected.



Operating voltage is shown in module window.

SELECTION OF OPERATING VOLTAGE

1. Open cover door, pull the FUSE PULL lever and rotate to left. Remove the fuse.
2. Remove the Line Voltage Selection Card. Position the card so the line voltage appears at top-left corner. Push the card firmly into the slot.
3. Rotate the Fuse Pull lever to its normal position. Insert a fuse of the correct value in the holder. Close the cover door.

Figure 2-1. Line Voltage and Fuse Selection

2-9. Verify that the line voltage selection card and the fuse are matched to the power source. Refer to Figure 2-1, Line Voltage and Fuse Selection.

2-10. Power Cable

WARNING

BEFORE CONNECTING THIS INSTRUMENT, the protective earth terminals of this instrument must be connected to the protective conductor of the (Mains) power cord. The Mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord (power cable) without a protective conductor (grounding).

2-11. This instrument is equipped with a three-wire power cable. When connected to an appropriate ac power receptacle, this cable grounds the instrument cabinet. The type of power cable plug shipped with each instrument depends on the country of destination. Refer to Figure 2-2 for the part numbers of the power cable available.

2-12. HP-IB Address and Parallel Poll Response Selection

2-13. In the Synthesizer, the HP-IB talk and listen addresses and the parallel poll sense and response line are switch selectable. The following procedure explains how the switches are to be set. Refer to Table 2-1 for a listing of the talk and listen address.

2-14. To change the HP-IB address or to select a different parallel poll response, the top cover of the Synthesizer and the internal A2 Assembly's cover must be removed.

a. Disconnect the line (Mains) power cable.

b. Remove any HP-IB cables or connectors from the HP-IB connector.

c. Remove the Synthesizer's top cover and the A2 Assembly's protective cover. Refer to the Disassembly and Reassembly Procedures in Section VIII.

d. If the parallel poll sense or response switches are to be changed, remove the A2A9 Board Assembly.

e. Select the new address as shown in Table 2-1. The location of the switches are shown on

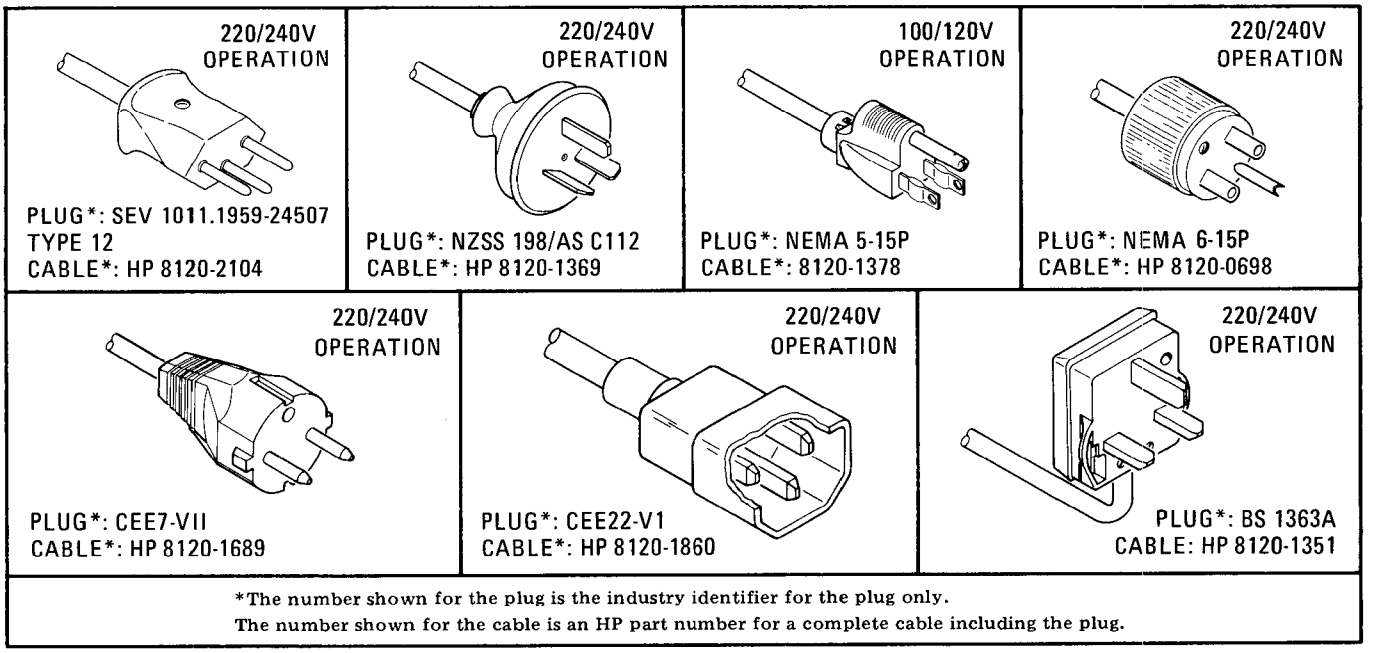


Figure 2-2. Power Cable and Mains Plug Part Numbers

HP-IB Address and Parallel Poll Response Selection (cont'd)

Figure 2-3. The HP-IB ADDRESS SELECT switch settings (for S1 and S2) are in the octal code. For example, the factory selected addresses are set to 23 (binary 10 011; equivalent to bits b5 through b1 on the table). Therefore, the listen address is '3' and the talk address is 'S'.

f. The PARALLEL POLL SENSE switch (S4) is set to either the OFF, 0 (zero) or 1 (one) position. In the zero position, the less positive level indicates an affirmative response to the poll.

g. The PPR (Parallel Poll Response) switch (S3) is set to select one of eight lines (one of 1 through 8). The selected line passes the Synthesizer's response to the parallel poll to the HP—IB controller.

h. Re-install the A2A9 Assembly.

i. Replace the A2 Assembly's internal cover and the Synthesizer's top cover.

j. Connect the line (Mains) power cable to the Line Power Module; connect the HP-IB cable to the HP-IB connector.

2-15. Interconnections

2-16. Interconnection data for the Hewlett-Packard Interface Bus is provided in Figure 2-4.

2-17. Mating Connectors

2-18. Interface Connector. The HP-IB mating connector is shown in Figure 2-4.

2-19. Coaxial Connectors. Coaxial mating connectors used with the Synthesizer should be 50-ohm Type-N male connectors that are compatible with those specified in US MIL-C-39012.

2-20. Operating Environment

2-21. The operating environment should be within the following limitations:

Temperature . . . . . 0°C to +55°C
Humidity . . . . . < 95% relative
Altitude . . . . . < 4570 metres (15 000 feet)

NOTE

RF Output accuracy, flatness and maximum power will meet specifications only between 15 and 35°C.

2-22. Bench Operation

2-23. The instrument cabinet has plastic feet and fold-away tilt stands for convenience in bench operation. (The plastic feet are shaped to ensure self-aligning of the instruments when stacked.) The tilt stands raise the front of the instrument for easier viewing of the control panel.

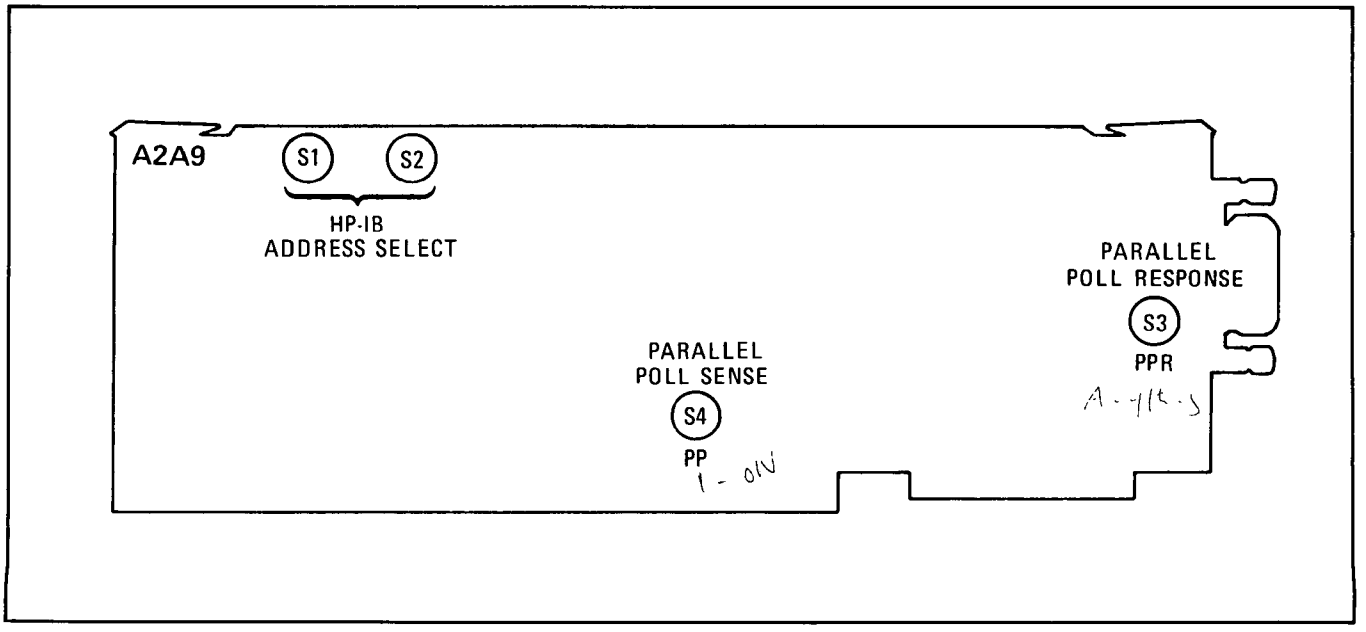
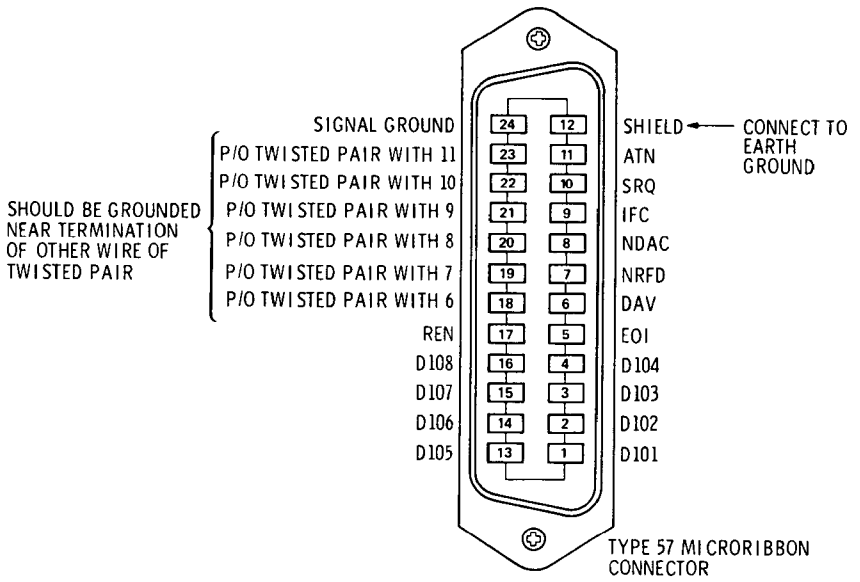


Figure 2-3. Location of HP-IB Address and Parallel Poll Switches



Logic Levels

The Hewlett-Packard Interface Bus logic levels are TTL compatible, i.e., the true (1) state is 0.0 Vdc to +0.4 Vdc and the false (0) state is +2.5 Vdc to +5.0 Vdc.

Programming and Output Data Format

Refer to Section III, Operation.

Mating Connector

HP 1251-0293; Amphenol 57-30240.

Mating Cables Available

HP 10833A, 1 metre (3.3 ft), HP 10833B, 2 metres (6.6 ft)
HP 10833C 4 metres (13.2 ft), HP 10833D, 0.5 metres (1.6 ft)

Cabling Restrictions

1. A Hewlett-Packard Interface Bus System may contain no more than 1.8 metres (6 ft.) of connecting cable per instrument.
2. The maximum accumulative length of connecting cable for any Hewlett-Packard Interface Bus System is 20.0 metres (65.6 ft.)

Figure 2-4. Hewlett-Packard Interface Bus Connection

Table 2-1. USA Standard Code for Information Interchange (ASCII)

BITS b_7 b_6 b_5	0_{0_0}	0_{0_1}	0_{1_0}	0_{1_1}	1_{0_0}	1_{0_1}	1_{1_0}	1_{1_1}	NOTE 3
b_4 ↓ b_3 ↓ b_2 ↓ b_1 ↓ Column→ / Row↓	0	1	2	3	4	5	6	7	
0 0 0 0 0	NUL	DLE	SP	0	@	P	`	p	
0 0 0 1 1	SOH	DC1	!	1	A	Q	a	q	
0 0 1 0 2	STX	DC2	"	2	B	R	b	r	
0 0 1 1 3	ETX	DC3	#	3	C	S	c	s	
0 1 0 0 4	EOT	DC4	$	4	D	T	d	t	
0 1 0 1 5	ENQ	NAK	%	5	E	U	e	u	
0 1 1 0 6	ACK	SYN	&	6	F	V	f	v	
0 1 1 1 7	BEL	ETB	'	7	G	W	g	w	
1 0 0 0 8	BS	CAN	(	8	H	X	h	x	
1 0 0 1 9	HT	EM	)	9	I	Y	i	y	
1 0 1 0 10	LF	SUB	*	:	J	Z	j	z	
1 0 1 1 11	VT	ESC	+	;	K	[	k	{	
1 1 0 0 12	FF	FS	,	<	L	\	l	|	
1 1 0 1 13	CR	GS	–	=	M	]	m	}	
1 1 1 0 14	SO	RS	.	>	N	^	n	~	
1 1 1 1 15	SI	US	/	?	O	_	o	DEL	
NOTE 3			NOTE 1		NOTE 2				

NOTE 1: HP-IB valid LISTEN addresses
NOTE 2: HP-IB valid TALK addresses
NOTE 3: Logic 1 = 0V

2-24. Rack Mounting

WARNING

The Synthesizer is heavy for its size (27.2 kg, 60 lb). Care must be exercised when lifting to avoid personal injury. Use equipment slides when rack mounting.

2-25. Rack Mounting information is provided with the rack mounting kits. If the kits were not ordered with the instrument as options, they may be ordered through the nearest Hewlett-Packard office. Refer to the paragraph entitled Options in Section I.

2-26. STORAGE AND SHIPMENT

2-27. Environment

2-28. The instrument should be stored in a clean dry environment. The following environmental limitations apply to both storage and shipment:
Temperature . . . . . .—55°C to +75°C
Humidity. . . . . < 95% relative
Altitude. . . . . .< 15 300 metres (50 000 feet)

2-29. Packaging

2-30. Tagging for Service. If the instrument doesn't operate properly and is being returned to Hewlett-Packard for service, please complete one of the blue repair tags located at the end of this manual and attach it to the instrument.

2-31. Original Packaging. Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also mark the container FRAGILE to assure careful handling. In any correspondence refer to the instrument by model number and full serial number.

2-32. Other Packaging. The following general instructions should be used for re-packaging with commercially available materials:

a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the service required, return address, model number, and full serial number.)

b. Use a strong shipping container. A double-wall carton made of 2.4 MPa (350 psi) test material is adequate.

c. Use enough shock-absorbing material (75 to 100 mm layer; 3 to 4 inches) around all sides of instrument to provide firm cushion and prevent movement in the container. Protect the control panel with cardboard.

d. Seal the shipping container securely.

e. Mark the shipping container FRAGILE to assure careful handling.

Table 3-1. Front Panel Features (2 of 2)

(12) **LINE switch:** applies power to the Synthesizer when set to the ON position; power is supplied to the crystal oven and the battery charger circuit in the STANDBY position.

(13) **FREQUENCY RESOLUTION pushbuttons:** selects tuning resolution in 100 MHz, 1 MHz, 10 kHz, or 1, 2, or 3 kHz steps (depending on the frequency selected). The HOLD switch (10) clears any frequency resolution selected.

(14) **TUNING control:** changes the Synthesizer's output frequency by the increments selected by the FREQUENCY RESOLUTION selectors (13).

(15) **AM function switch:** selects OFF, 30%/V, or 100%/V modulation by a signal applied to the AM INPUT connector (19). The selected range is displayed on the AM annunciator (5). Modulation percentage is read on the Meter (2) when the METER MODE selector (28) is set to AM. AM may be remotely programmed.

(16) **FM INPUT connector:** accepts a maximum 1 Vpk external modulation signal (50Ω source impedance). Deviation varies linearly with the input signal. Deviation ranges are controlled by the FM DEVIATION switch (18) or remotely programmed.

(17) **ALC switch:** selects either internal (INT) leveling, external crystal (XTAL), or external power meter (PWR MTR) leveling. The external leveling device (crystal or power meter) may have either a positive or negative output. The ALC selector can be remotely programmed.

(18) **FM DEVIATION MHz switch:** selects the meter scale and peak deviation that is obtained with a signal applied to the FM INPUT connector (16). The peak deviation range is displayed on the FM annunciator (6) and the actual peak deviation is read from the selected scale on the Meter (2). The FM DEVIATION MHz selector can be remotely programmed.

(19) **AM INPUT connector:** accepts a maximum 1 Vpk external modulation signal (600 ohm impedance). A 1 Vpk signal develops full scale modulation as selected by the AM selector (15) or as programmed remotely. Percent modulation varies linearly with the input signal.

(20) **OUTPUT LEVEL VERNIER:** adjusts the RF output level over the range of +3 to −10 dB, relative to the Output Level Range as read on the Meter (2). The Vernier function is programmable in 1 dB steps.

(21) **EXT ALC INPUT connector:** accepts positive or negative leveling signals from either a power meter or crystal detector as selected by the ALC selector (17).

(22) **Mechanical Meter Zero:** sets meter suspension so the Meter (2) indicates zero when power is removed from the Synthesizer and the Synthesizer is in its normal operating position.

(23) **CAL control:** adjusts the ALC gain to match the external leveling device in use. The CAL control must be returned to the fully clockwise position when the Synthesizer is returned to internal leveling.

(24) **OUTPUT LEVEL RANGE:** selects the RF output level range in 10 dB steps from +10 to −110 dBm. The selected range is displayed by the RANGE dBm LED readout (1). The range may also be programmed remotely.

(25) **PEAK-NORM control:** generally left in the NORM detented position (fully clockwise). It is used to peak the RF output at a particular frequency in the band at the expense of power at other frequencies.

(26) **RF OUTPUT connector:** 50 ohm type-N female connector supplies the RF output over the entire frequency range of 2 to 18 GHz.

(27) **RF switch:** completely turns off the RF output when in the OFF position. This condition is displayed in the RF annunciator (3) and causes the NOT PHASE LOCKED annunciator in the STATUS Block (9) to illuminate. When the ON position is selected, the Synthesizer returns to normal operation. The functions of the RF switch are programmable.

(28) **METER MODE switch:** selects either LEVEL, AM, or FM to be displayed on the meter (2).

Table 3-2. Rear Panel Features

1. **HP-IB CONNECTOR:** connects the Synthesizer to the Hewlett-Packard Interface Bus for remote operation. When in remote operation, the STATUS Block (see Figure 3-1) 9 REMOTE annunciator illuminates.

2. **100 MHz OUT (A3J7):** 0 dBm (nominal) into 50 ohms, can be used as an external timebase and for troubleshooting.

3. **RF OUT (A3J6):** only for Options 004 and 005, 50 ohm type N output connector (see Table 1-1 for Option information).

4. **10 MHz OUT (A3J8):** 0 dBm (nominal) into 50 ohms, can be used as an external timebase and for troubleshooting.

5. **FREQ STANDARD Output (A3J9):** 10.000 MHz into 50 ohms at +7 dBm (nominal) from the internal frequency standard except when INT/EXT switch 6 is in the EXT position.

6. **FREQ STANDARD INT/EXT switch:** normally left in the INT position. Removes power from internal frequency standard when in the EXT position.

7. **Jumper (A3W3):** normally connects the Internal Frequency Standard Output (A3J9) to the External Frequency Standard Input (A3J10).

8. **FREQ STANDARD Input (A3J10):** normally connected by A3W3 to A3J9. Also used to connect an external frequency standard of 5 or 10 MHz at 0 dBm to the Synthesizer.

9. **Line Power Module:** permits operation from 100, 120, 220, or 240 Vac. The number visible in the window displays the nominal line (Mains) voltage for which the Synthesizer is set (see Figure 2-1). The protective grounding conductor connects to the Synthesyzer through this module. The line power fuse (A3F1) is part of this module and is the only part to be changed by the operator.

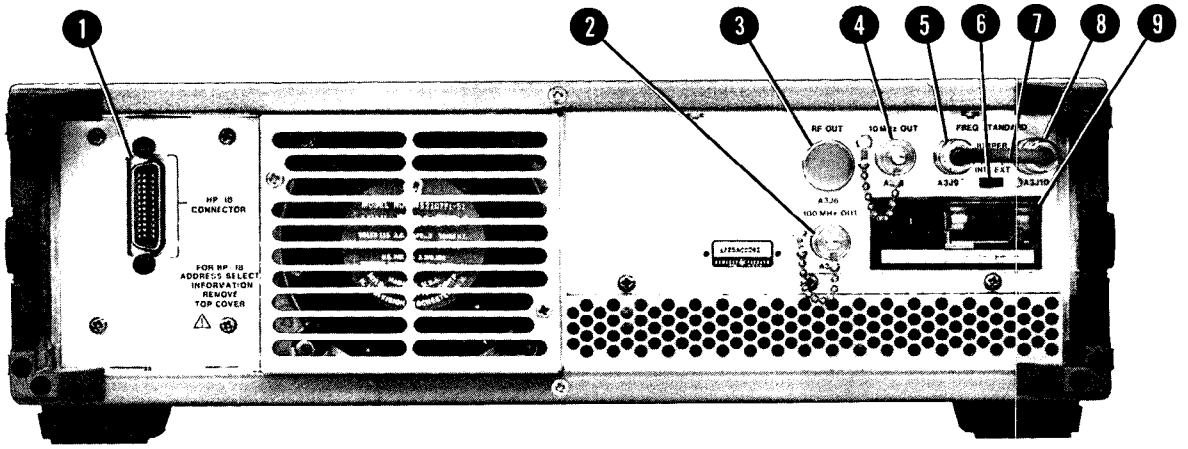


Figure 3-2. Rear Panel Connectors, Switches, and Displays

Table 3-3. Local Operator's Checks (1 of 4)

INITIAL CONDITIONS

1. Check that the LINE switch (12) is in STANDBY and remove the power cable from the Line Power Module (9) (see Figure 3-2).

2. Check that Line Power Module (9) (see Figure 3-2) is set to the nominal line voltage to be used and that the fuse is the correct value and type.

3. Set the front panel controls and switches as follows:

(15) AM selector	OFF
(17) ALC selector	INT
(18) FM DEVIATION MHz selector	OFF
(20) OUTPUT LEVEL VERNIER control	fully ccw
(24) OUTPUT LEVEL RANGE control	fully ccw
(25) PEAK-NORM switch	NORM (detented)
(27) RF switch	OFF
(28) METER MODE selector	LEVEL

4. Set the rear panel controls and cables as follows:

(6) FREQ STANDARD INT/EXT switch	INT
(7) Jumper (A3W3)	Connects A3J9 to A3J10

OPERATION

1. Set the LINE switch (9) to ON and check for the following conditions:

(1) RANGE dBm display	−110 dBm
(3) RF annunciator	OFF
(4) ALC annunciator	INT and LEV UNCAL
(5) AM annunciator	OFF
(6) FM annunciator	OFF
(7) FREQUENCY MHz display	some frequency between 2—18.6 GHz (if frequency display is not stable, press PRESET (3 GHz) (11) key.
(8) Frequency Resolution Light Bars	extinguished
(9) STATUS annunciators	
OVEN	may be lit and will extinguish when the reference oscillator oven operating temperature is reached.
NOT PHASE LOCKED	illuminated and will generally extinguish when the reference oscillator has warmed up before the OVEN light extinguishes.

2. Press PRESET (3 GHz) key (11) and FREQUENCY display (7) should now indicate 3000.000 MHz.

Table 3-3. Local Operator's Checks (2 of 4)

OPERATION (Cont'd)

3. Press one at a time, the four FREQUENCY RESOLUTION keys (13) ; the Frequency Resolution Light Bars (8) should light one at a time and remain lit. Rotate the TUNING control (14) clockwise and then counter-clockwise and note that the digits displayed in the FREQUENCY display (8) increase and then decrease in order as the TUNING control (14) is turned. Perform this step as each of the four FREQUENCY RESOLUTION keys (13) are pressed. The first key on the left produces resolution in 100 MHz steps, the second key 1 MHz steps, the third key 10 kHz steps, and the fourth key 1 kHz, 2 kHz, or 3 kHz steps, depending upon the frequency band. Pressing the fourth key first will cause all four of the Frequency Light Bars (8) to light. Pressing the HOLD (10) pushbutton causes the Light Bars (8) to extinguish and prevents the TUNING control (14) from changing the frequency displayed.

4. Connect a microwave frequency counter to the Synthesizer as shown in Figure 3-3.

5. Set the RF switch (27) to ON. The ALC Block (4) annunciator LEV UNCAL should extiguish. If the STATUS Block (9) annunciator OVEN is extinguished, the NOT PHASE LOCKED annunciator should also extinguish. The Meter (2) should indicate −10 dB.

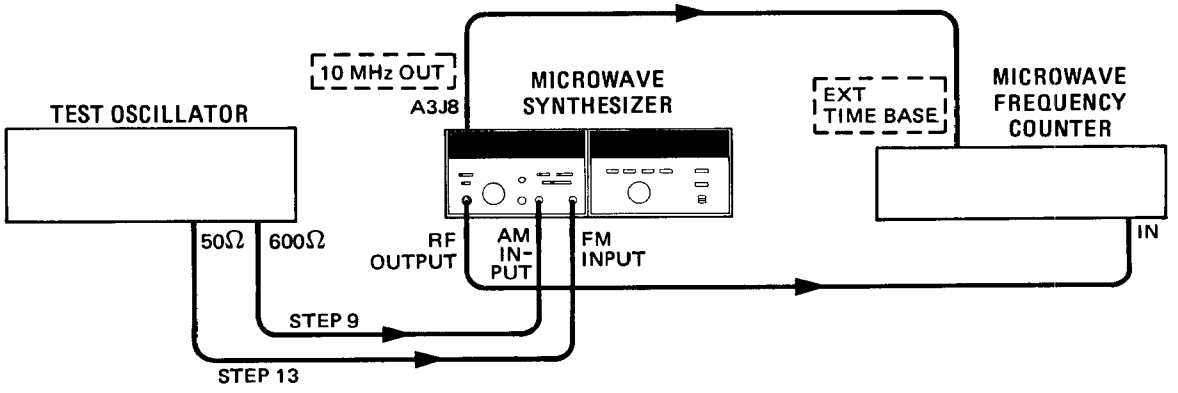


Figure 3-3. Operator's Frequency and Modulation Checks Test Setup

6. Turn the OUTPUT LEVEL RANGE control (24) clockwise through each of the thirteen positions (−110 to +10 dBm). At the 0 and +10 dBm positions and any other positions of interest, vary the OUTPUT LEVEL VERNIER control (20) from −10 to +3 dB. In the +10 dBm range, the VERNIER's range is specified only to +3 dBm output level but some Synthesizers may deliver more power. The RF Block (3) annunciator OVER RANGE lights when the +10 dBm range is selected. If the desired power cannot be produced, the ALC Block (4) annunciator LEV UNCAL is illuminated.

Table 3-3. Local Operator's Checks (3 of 4)

OPERATION (Cont'd)

7. Note the frequency on the FREQUENCY MHz display (7). Set the LINE switch (12) to the STANDBY position. The STATUS Block (9) annunciator STANDBY should light. Leave the Synthesizer in the standby condition for several seconds.

8. Set the LINE switch (12) to ON. The FREQUENCY MHz display (7) should display the same frequency as was displayed in step 7. The STATUS Block (9) annunciator STANDBY should extinguish.

9. Apply power to the test oscillator, set the frequency to 10 kHz and the output level to 0 Vrms. Connect the test setup as shown in Figure 3-3.

10. Set the METER MODE selector (28) to AM and the AM selector (15) to 100%. The AM annunciator (5) 100% should be lit.

11. Increase the output of the test oscillator slowly from 0.0 to approximately 0.8 Vrms. As the Meter (2) approaches full scale, the ALC Block (4) annunciator LEV UNCAL should illuminate. The LEV UNCAL annunciator is being used in this test as a modulation indicator. Normally having this annunciator illuminate indicates excessive modulation.

12. Set the AM selector (15) to OFF, reduce the test oscillator's output to 0 Vrms, and remove the cable from the AM INPUT connector (19).

13. Set the test oscillator's frequency to 100 kHz.

14. Set the METER MODE selector (28) to FM and the FM DEVIATION MHz selector (18) to 3. The FM annunciator (6) 3 will light.

15. Increase the test oscillator's output from 0 Vrms to approximately 0.5 Vrms. The FM annunciator (6) OVERMOD will light when there is excessive deviation or an input signal greater than 1 Vpk.

16. Disconnect the test setup.

17. Set the ALC selector (17) to INT, METER MODE selector (28) to LEVEL, and the OUTPUT LEVEL RANGE control (24) to −10 dBm shown in the RANGE dBm display (1). Adjust the OUTPUT LEVEL VERNIER control (20) for 0 dB on the Meter (2). This will develop a −10 dBm level at the RF OUTPUT connector (26).

18. Set the RF Switch (27) to OFF, and the ALC selector (17) to PWR MTR. Connect a power meter and power sensor as shown in Figure 3-4. The Recorder Output from the power meter may be either positive or negative polarity.

NOTE

The HP Model 436A Power Meter must be set to RANGE HOLD mode for use in this test setup.

Table 3-3. Local Operator's Checks (4 of 4)

OPERATION (Cont'd)

19. Set the RF switch (27) to ON. Adjust the CAL control (23) for a steady indication of the Meter (2). This adjusts the loop gain and prevents unwanted oscillations. The ALC Block (2) annunciator LEV UNCAL lights when oscillations occur or the loop opens, causing unleveling to occur.

20. Set the RF switch (27) to OFF. Disconnect the power meter and power sensor.

21. Connect a crystal detector as shown in Figure 3-4. Set the ALC selector (17) to XTAL.

NOTE

The output voltage from the crystal detector may be either negative or positive polarity.

22. Set the RF switch (27) to ON and adjust the CAL control (23) for a steady indication on the Meter (2).

23. Set the RF switch (27) to OFF. Disconnect the test setup.

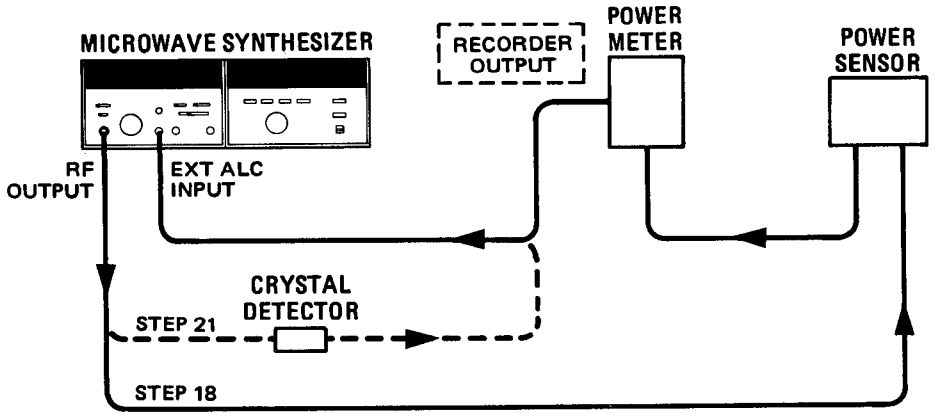


Figure 3-4. Operator's External ALC Checks Test Setup

Table 3-4. Local Operating Instructions (1 of 4)

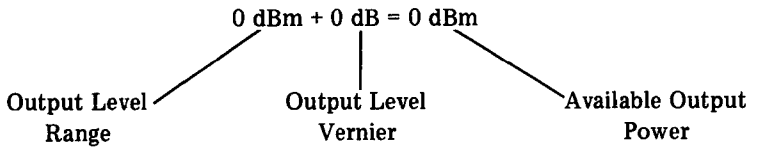
SETTING FREQUENCY AND OUTPUT LEVEL

1. Be sure the Synthesizer is set to local. Make sure the internal reference is selected or an external reference is connected to A3J10.

2. Set front panel controls and switches to the following positions:

12	LINE switch	ON
13	FREQUENCY RESOLUTION keys . . .	to resolution desired and displayed on Frequency Resolution Light Bars 8
14	TUNING control	to frequency desired as displayed on Frequency readout 7
10	HOLD pushbutton	press pushbutton, the frequency desired is not held
24	OUTPUT LEVEL RANGE control	00 on RANGE dBm display 1
27	RF switch	ON
20	OUTPUT LEVEL VERNIER control . . .	0 dB on Meter 2

This sets a power level of 0 dBm at the RF OUTPUT connector 26.



3. Set the OUTPUT LEVEL RANGE control 24 to indicate −10 dBm in the RANGE dBm display 1. Adjust the OUTPUT LEVEL VERNIER control 20 to indicate −5 dB on the Meter 2. This sets an output power level of −15 dBm at the RF OUTPUT connector 26.

$$-10 \text{ dBm} + (-5 \text{ dB}) = -15 \text{ dBm}$$

The indication on the Meter 2 plus the reading on the RANGE dBm display 1 equals the power level at the RF OUTPUT connector 26.

Table 3-4. Local Operating Instructions (2 of 4)

USING AN EXTERNAL STANDARD

1. On the rear panel (see Figure 3-2), remove Jumper (7) (A3W3) from the FREQ STANDARD EXT connector (8) (A3J10), and set the FREQ STANDARD INT/EXT switch (6) to EXT.

2. Connect an external frequency standard of 5 or 10 MHz, 0 dBm (nominal) into 50 ohms impedance to the FREQ STANDARD EXT connector (8).

3. Set the LINE (12) switch to ON and the RF switch (27) to ON.

4. The front panel display should indicate as follows:

   STATUS annunciator. . . . . INTERNAL REF OFF

   The NOT PHASE LOCKED annunciator may light if the external reference is not of sufficient accuracy in frequency or has an insufficient power level. The external reference must be within ±200 Hz of 10 MHz or ±100 Hz of 5 MHz for reliable locking to occur.

5. The Synthesizer may now be used for any of its normal operations.

SETTING AMPLITUDE MODULATION

1. Set front panel (see Figure 3-1) controls and switches as follows:

   (28) METER MODE selector . . . . . AM

2. Connect an oscillator with a 600 ohm output impedance to the AM INPUT connector (19). Set the oscillator's output to 0 Vrms and to the modulation frequency desired.

3. Set the AM Function switch (15) to 30% or 100%. The Meter (2) should indicate 0% on the 0 to 3 scale, or 0% on the 0 to 10 scale.

4. Set the OUTPUT LEVEL VERNIER control (20) and the OUTPUT LEVEL RANGE control (24) to the level desired from the RF OUTPUT connector (26). The OUTPUT LEVEL VERNER (20) control should be set to 0 dB or below for least distortion.

5. Increase the oscillator's output until the desired percent modulation between 0 to 30% (full scale) is reached. Full scale is 1 Vpk.

Table 3-4. Local Operating Instructions (3 of 4)

SETTING FREQUENCY MODULATION

1. Set front panel (see Figure 3-1) controls and switches as follows:
   (28) METER MODE selector . . . . . FM

2. Connect a modulation source with a 50 ohm output impedance to the FM INPUT connector (16). Set the oscillator's output to 0 Vrms and to the modulation frequency desired.

3. Set the FM DEVIATION MHz selector (18) to the desired deviation range. The peak deviation is shown on the Meter (2). The 0.03, 0.3, and 3 ranges are indicated on the Meter (2) on the 0 to 3 scale and the 0.1, 1, and 10 ranges are indicated on the 0 to 1.0 scale.

4. An FM input of 1.0 Vpk (0.707 Vrms) represents full scale modulation. Set the input level to obtain the desired deviation within the specified modulation index and deviation limits.

5. The FM annunciator (6) OVERMOD will light to indicate that an over modulation condition exists. This can occur if an input signal of greater than 1 Vpk is applied or if the maximum allowable modulation index is exceeded. The STATUS BLOCK (9) annunciator NOT PHASE LOCKED may also illuminate under conditions of excessive deviation.

SETTING EXTERNAL ALC WITH A POWER METER OR CRYSTAL DETECTOR

1. Set front panel (see Figure 3-1) controls and switches as follows:
   (25) PEAK-NORM control . . . . . NORM (detented)
   (27) RF switch . . . . . ON
   (28) Meter Mode selector . . . . . LEVEL

2. Set the LINE switch (12) to ON and set the OUTPUT LEVEL VERNIER control (20) and the OUTPUT LEVEL RANGE control (24) for −10 dBm output.

3. Connect the external leveling crystal detector (XTAL) or a power meter (PWR MTR) to sense the RF signal level at the point to be leveled. The leveling device may produce either a positive or negative polarity output voltage. The Synthesizer automatically produces the proper polarity signal to use with the ALC loop.

4a. If using a crystal detector, connect the detectors output to the EXT ALC INPUT connector (21). Set the ALC selector (17) to XTAL.

4b. If using a power meter, connect the Recorder Output to the EXT ALC INPUT connector (17). Set the ALC selector (21) to PWR MTR.

Table 3-4. Local Operating Instructions (4 of 4)

SETTING EXTERNAL ALC WITH A POWER METER OR CRYSTAL DETECTOR (Cont'd)

NOTE

If the HP 436A Power Meter is to be used, set the Synthesizer's output level to −1 dBm with the ALC selector (17) set to INT. Depress the RANGE HOLD pushbutton on the 436A. If the RANGE HOLD pushbutton is not depressed, the power meter may slowly oscillate due to autoranging.

5. Set the OUTPUT LEVEL RANGE control (24) and the VERNIER control (20) for the desired power level.

6. Adjust the CAL control (23) to obtain a stable, leveled power output 10 dB below the output level indicated by the RANGE dBm display (1) and the indication on the Meter (2) . The 10 dB offset places the ALC loop in the center of its dynamic range.

3-16. REMOTE (HP-IB) OPERATION

3-17. The Synthesizer can be operated through the Hewlett-Packard Interface Bus (HP-IB). For further information about the HP-IB, refer to IEEE Standard 488-1975, the Hewlett-Packard catalog, and the booklet "Improving Measurements in Engineering and Manufacturing" (HP Part No. 5952-0058). Synthesizer compatibility, programming, and data format is described in the paragraphs which follow.

3-18. Synthesizer Talk and Listen address, and Parallel and Serial Poll response selection is described in Section II.

3-19. For Synthesizer remote checkout and troubleshooting, refer to the Remote Operator's Check and the HP-IB Diagnositc Program in Section VIII. The Remote Operator's Check verifies that the Synthesizer's functions can be programmed while the HP-IB Diagnostic Program tests the Bus functions of the Synthesizer.

3-20. Compatibility

3-21. The Synthesizer is fully programmable with the HP-IB. Front panel functions except the LINE switch (12), (see Figure 3-1). METER MODE selector (28), PEAK-NORMAL control (25), and CAL control (23) can be programmed.

3-22. The programming capability of the Synthesizer will be described in terms of the twelve bus messages found in Table 3-5.

3-23. Local/Remote and Remote/Local Mode Changes

3-24. The Synthesizer can communicate over the bus when in remote or local. In remote, the Synthesizer's front panel controls are disabled and the Synthesizer can be addressed to talk or listen. When addressed to listen, the Synthesizer will respond to the Data, Clear (SDC), Local, and Clear Lockout/Set Local. When addressed to talk, the Synthesizer automatically stops listening and sends a status byte over the eight data lines. Also, the Synthesizer can send a service request (SRQ) and respond to serial and parallel polls and the Abort message. In local, the Synthesizer is fully controlled by the front panel, but it will respond to serial or parallel polls, it's talk address, and it will send a service request (SRQ).

3-25. Addressing. The Synthesizer interprets the byte on the bus' eight data lines as an ASCII address or command if the remote enable line (REN) is true and the bus is in the command mode: attention line (ATN) true and interface clear line (IFC) false. The Synthesizer's talk and listen addresses are switch selectable as described in Section II. Referring to Table 2-1, characters in columns 2 or 3 are valid listen addresses, characters in columns 4 and 5 are talk addresses, and characters in column 1 are commands: device clear (DC), serial poll enable (SPE), and serial poll disable (SPD).

3-26. Programming the Local to Remote Mode Change. The Synthesizer will switch to remote only when addressed to listen. When first switched to remote, the REMOTE lamp lights and the VERNIER resets to −10 dB. Nothing else will change from the front panel control settings until the Synthesizer receives a data message string. Once in remote, the synthesizer can be addressed to talk, re-addressed to listen, programmed to return to local, or unaddressed with the universal Unlisten address or Abort message.

3-27. Programming the Remote to Local Mode Change. The Synthesizer will return to local when the Local or Clear Lockout/Set Local messages are sent by the controller. The Clear Lockout/Set Local message sets the remote enable line (REN) false.

3-28. Data Messages

3-29. The Synthesizer communicates on the bus primarily with data messages. It responds to data messages that program frequency, output level, modulation and ALC configuration. It sends a byte that describes its status. Data messages consist of one or more bytes sent over the bus' 8 data lines when the bus is in the data mode (attention line [ATN] false). The Synthesizer receives data messages when addressed to listen and sends a status byte when addressed to talk.

3-30. Receiving Data Messages

3-31. The Synthesizer can receive Data messages when addressed to listen. The Data message string, or program string, consists of one or more ASCII characters, arranged as a program code followed by arguments. The codes and arguments for a given function need not be on the same program line.

3-32. Data Input Format. The program string syntax is as shown in Example 1. For example, to program the four functions for 12.596365 GHz, −94 dBm AM and FM OFF, and ALC internal normal, use the program codes and arguments in Table 3-10 and write the string as in Example 2.

Table 3-5. Message Reference Table

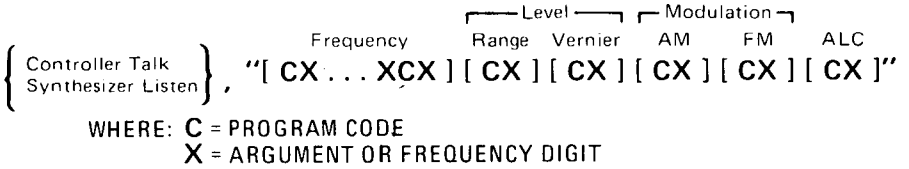
Message and Identification	Applicable	Command and Title	Response
Data	Yes	T6 Talker, L4 Listener, AH1 Acceptor Handshake SH1 Source Handshake	Synthesizer can change frequency, output level, modulation, and ALC. Sends status byte when addressed to talk.
Trigger (DTØ)	No	Device Trigger	Synthesizer does not respond to a Device Trigger.
Clear (DC1)	Yes Yes	DCL Device Clear SDC Selected Device Clear	The Synthesizer responds to a DCL or SDC command by setting frequency to 3 GHz, Modulation to off, RF off, and ALC to Internal.
Remote (RL2)	Yes	REN Remote Enable	Synthesizer goes to remote when the REN line is true and the Synthesizer is first addressed to listen.
Local (RL2)	Yes	GTL Go to Local	Synthesizer goes to local when a GTL command is received. The frequency does not change but the front panel controls determine the other functions.
Local Lockout (RL2)	No	LLO Local Lockout	Synthesizer does not respond to the LLO command.
Clear Lockout/ Set Local (RL2)	Yes	REN Remote Disable	Synthesizer goes to local when REN goes false.
Pass Control/ Take Control (CØ)	No	Controller	The Synthesizer cannot act as a controller.
Require Service (SR1)	Yes	SRQ Service Request	The Synthesizer sets SRQ line true when when unlocked, unleveled, FM overmodulated or out of range (freq.).
Status Byte	Yes Yes	SPE Serial Poll Enable SPD Serial Poll Disable	The Synthesizer responds to a serial poll by sending a status byte.
Status Bit (PP2)	Yes	PP Parallel Poll	The Synthesizer responds to a parallel poll by sending a status bit on a switch selected data line.
Abort	Yes	IFC Interface Clear	The synthesizer stops listening or talking.

NOTE

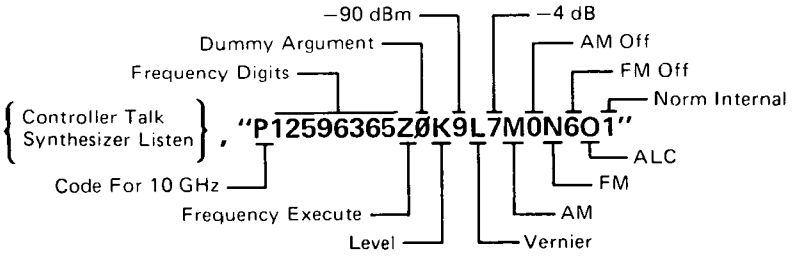
Complete HP-IB capability as defined in IEEE Std. 488 is DC1, RL2, SR1, PP2, T6, L4, AH1, SH1, DTØ, CØ.

Receiving Data Messages (Cont'd)

EXAMPLE 1



EXAMPLE 2



The Synthesizer ignores spaces, commas, decimal points, carriage returns, and line feeds. Paragraph 3-37 has more information on program codes. All functions may be programmed together as shown or separately as will be described in detail in the following paragraphs.

3-33. Programming Frequency. The Synthesizer accepts any frequency within its range to 8 significant digits. Above 6.2 GHz the 1 kHz digit is rounded up or down to be compatible with the 2 kHz or 3 kHz resolution. Use Figure 3-5 and Table 3-6 to write the program string with the following syntax:

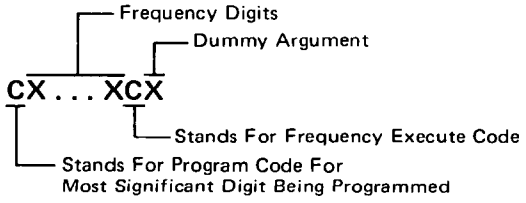


Table 3-6. Frequency Program Codes and Arguments

	Program Codes		Arguments
FREQUENCY	10 GHz	P	Ø THROUGH 9
	1 GHz	Q	
	1 MHz	T	
	100 kHz	U	
	10 kHz	V	
	1 kHz	W	
	EXECUTE	Z	

Within the Synthesizer, frequency information is stored in two blocks of four digits each. One block is for the 10 GHz through 10 MHz digits; the other block is for the 1 MHz through 1 kHz digits. Programming within one block does not change the other block unless it is necessary for the Synthesizer to round off the 1 kHz digit for frequencies above 6.2 GHz. Figure 3-5 illustrates this; use it as a guide to make Frequency programming easier.

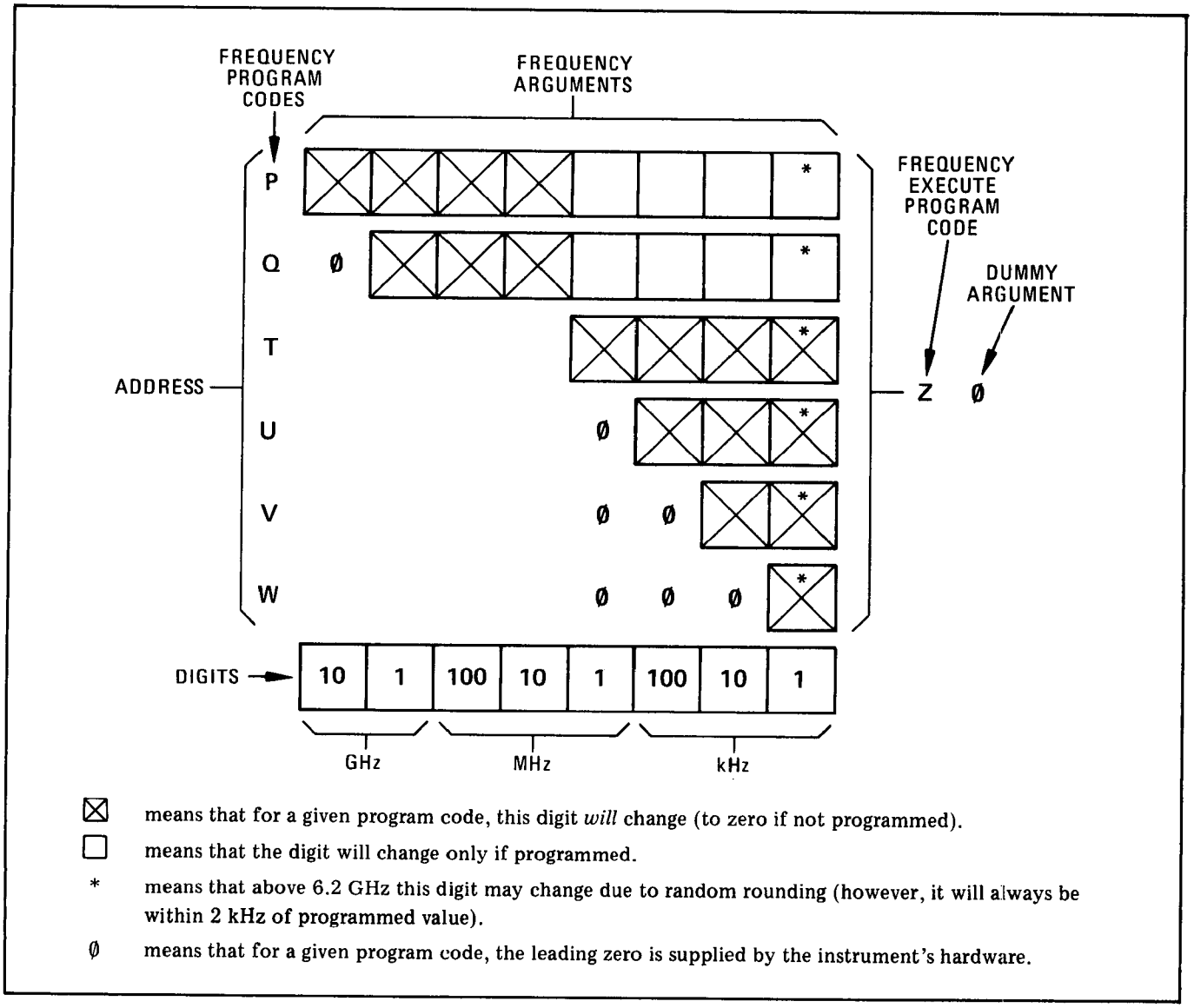
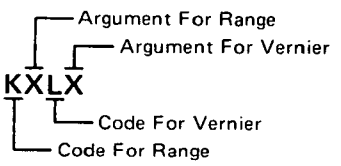


Figure 3-5. Frequency Programming

Receiving Data Messages (Cont'd)

3-34. Programming Output Level. The 0 to −110 dBm positions of the Synthesizer's RANGE switch, and the Functions of the VERNIER control are programmed with the output level string. The VERNIER control's function is programmed in 1 dB steps from +3 to −10 dB. RANGE is programmed in 10 dB steps, and the +10 dB position (over-range) of the RANGE switch is programmed with the ALC code and argument (see paragraph 3-36). Although it is possible to program the +10 dB range with 10 dB step attenuation (RANGE) it is unnecessary and should not be done[1]. The output level program string consists of the program codes for RANGE and VERNIER each followed by an argument (Table 3-7) as shown.



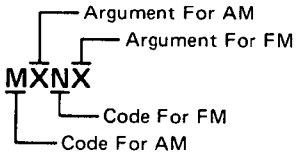
[1] For the Synthesizer to achieve a +10 dBm output level, the RANGE and VERNIER arguments must be set for 0 dBm.

Table 3-7. Output Level

	Program Codes	Arguments	
Output Level Range	K	0 dBm	Ø
		−10	1
		−20	2
		−30	3
		−40	4
		−50	5
		−60	6
		−70	7
		−80	8
		−90	9
		−100	:
		−110	;
Output Level Vernier	L	+3 dB	Ø
		+2	1
		+1	2
		0	3
		−1	4
		−2	5
		−3	6
		−4	7
		−5	8
		−6	9
		−7	:
		−8	;
		−9	<
		−10	=

Receiving Data Messages (Cont'd)

3-35. Programming Modulation. The Synthesizer accepts codes and arguments (Table 3-8) for two ranges of AM and six ranges of FM. The two modulation types can be used separately or together. Program string syntax is as follows:



3-36. Programming ALC. The ALC program string controls the functions of the RF ON-OFF switch, the ALC selector switch, and the +10 dBm position of the output level RANGE switch. The string consists of the program code, which is O (the letter O), followed by a single argument representing the desired combination of the switch positions. Each switch position has a numerical weight. Compute the argument by adding the weights (use the equal sign [=] for a weight of 13, and the question mark [?] for a weight of 17).

Table 3-8. Modulation

	Program Codes	Arguments	
AM	M	OFF	0 or 1
		100%	2
		30%	3
FM	N	OFF	6 or 7
		30 kHz	5
		100 kHz	4
		300 kHz	3
		1 MHz	2
		3 MHz	1
		10 MHz	Ø

Weighting is as follows:

RF ON-OFF switch;	ALC switch;	RANGE switch;
OFF = 0	INT = 0	0 dBm = 0
ON = 1	XTAL = 4	+10 dBm = 2
	MTR = 12	

Note that for the Synthesizer to achieve a +10 dBm RF output level, the output level RANGE and VERNIER arguments must be set for 0 dBm and the ALC argument must be appropriate for +10 dBm output. With RF OFF, combinations of the other two switches results in arguments of 0, 2, 4, 6, or 8. For RF ON, possible arguments are in the following table:

Table 3-9. ALC Arguments (with RF ON)

ALC switch \ RANGE switch	0 dBm	+10 dBm
INT	1	3
XTAL	5	7
MTR	=	?

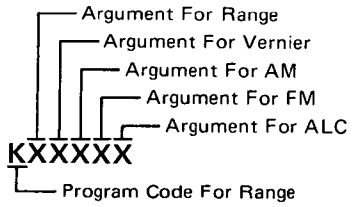
In general, an even argument results in the RF ON-OFF switch being set OFF, while an odd argument results in RF ON with the other switch combinations as shown in the table.

3-37. Optional Program Codes. The Synthesizer interprets any ASCII character in columns 4 and 5 of Table 2-1 as a program code. The two columns are equivalent; for example, it will respond the same way to "Z" as it does to "J". The Synthesizer ignores all other characters.

3-38. Abbreviated Program String. The Synthesizer accepts and processes the characters of a pro-

Receiving Data Messages (Cont'd)

gram string in a left to right sequence. It also automatically counts program codes in the sequence shown in Table 2-1 columns 4 and 5. This sequence is equivalent to the program string order shown in paragraph 3-32. If done in that sequence, program strings for level, modulation, and ALC can be written like those for frequency. The program string will consist of the program code for the first function being programmed followed by arguments for all functions as shown below:



3-39. Programming Execution Time. Programming execution time is determined by two parameters: the rate at which data can be input into the Synthesizer over the interface and the time it takes the Synthesizer to reach the desired output state. The Synthesizer can typically accept data at rates up to 80 kbytes/second. This is generally a much shorter time than it then takes the Synthesizer to reach the desired output state. If the controller and all other instruments on the bus are fast enough, data transfer is then only a small fraction of the total program execution time. Typical execution times for the various functions of the Synthesizer are as follows:

a. Frequency Switching. The time it takes to switch from one frequency to the next depends on the largest frequency digit being changed. Generally, the smaller the digit being changed, the shorter the switching time. Typical switching times by largest digit being changed on the 2.0 to 6.2 GHz band are shown in Figure 3-6 below. For higher bands, actual digits being changed must be determined by dividing the output frequency by 2 (6.2 to 12.4 GHz band), or by 3 (12.4 to 18 GHz band). If FM is on during a frequency change, switching time will increase.

Largest Digit Changed	100 MHz	10 MHz	1 MHz	100 kHz	10 kHz	1 kHz
Time to be Within 1 kHz	10 ms	10 ms	10 ms	5 ms	3 ms	1.5 ms

b. Output Level Programming

Output range switching (10 dB steps .... <20 ms
Output vernier switching (1 dB steps) ... <10 ms
RF ON/OFF switch ON ..... <30 ms
RF ON/OFF switch OFF ..... < 5 ms

c. Modulation Programming

FM range change and frequency change in FM mode ..... <50 ms
AM range change ..... <15 ms

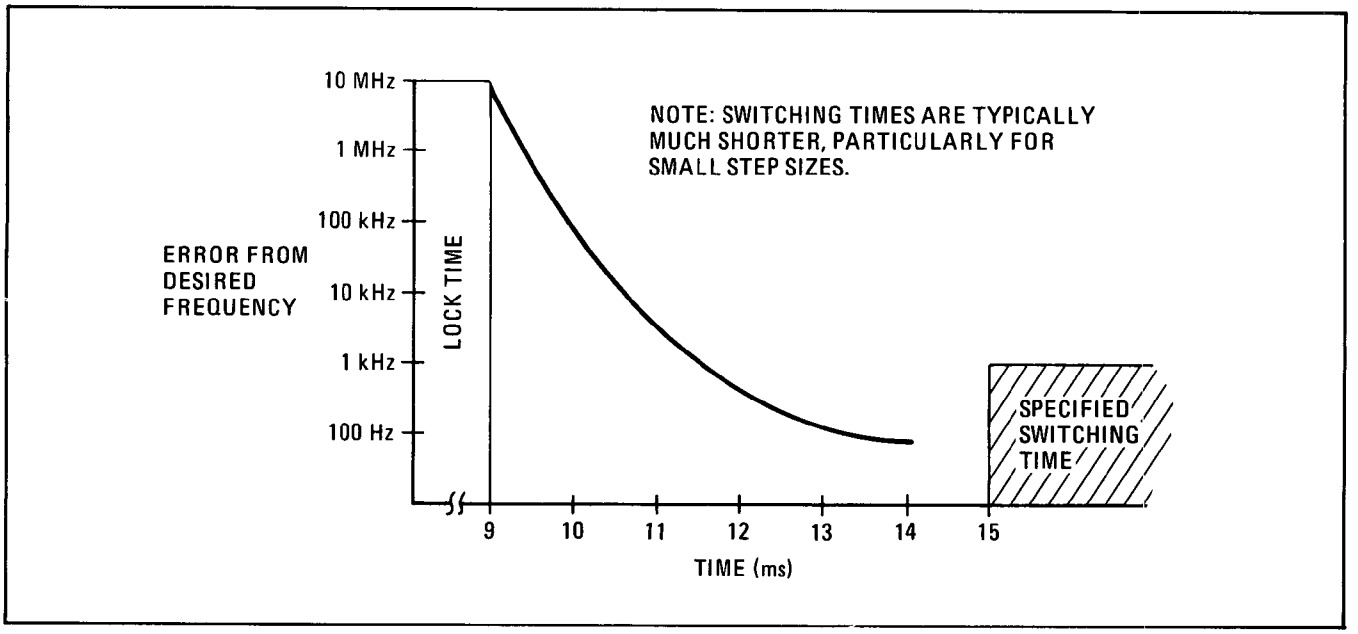


Figure 3-6. Typical frequency switching time showing WORST CASE lock and settling times

3-40. Sending Data Messages

3-41. The Synthesizer sends a status byte when addressed to talk. This byte is the Synthesizers response to a serial poll which will be explained in paragraph 3-59. The Synthesizer will talk when in local as well as remote.

3-42. Receiving the Trigger Message

3-43. The Synthesizer doesn't respond to the Trigger message.

3-44. Receiving the Clear Message

3-45. The Synthesizer responds to the Clear message by setting the frequency to 3 GHz, ALC to internal, RF power off, and modulation off. This message can take two forms: Device Clear, which the Synthesizer responds to when not addressed, and Selected Device Clear which the Synthesizer responds to when addressed to listen. The Device Clear messages do not affect addressing.

3-46. Receiving the Remote Message

3-47. The Synthesizer is enabled to go into remote when the controller sends the Remote message, but does not actually switch to remote until first addressed to listen. The Remote message is the means by which the controller sets the remote enable line (REN) true. Some controllers send this message automatically when first turned on or reset.

3-48. Receiving the Local Message

3-49. The Synthesizer returns to local front panel control when it receives the Local message. The frequency will not change from the last programmed value but the other functions will correspond to the front panel control settings.

3-50. Receiving the Local Lockout Message

3-51. The Synthesizer does not respond to the Local Lockout message.

3-52. Receiving the Clear Lockout/Set Local Message

3-53. The Synthesizer responds to the Clear Lockout/Set Local message in the same way as to the Local message (that is, it returns to local). The Synthesizer need not be addressed to listen. This message sets the REN line false.

3-54. Receiving the Pass Control Message

3-55. The Synthesizer does not respond to the Pass Control message as it cannot act as a controller.

3-56. Sending the Require Service Message

3-57. The Synthesizer sends the Require Service message to the controller when one of the following conditions exists for more than 50 ms:

1) Not phase-locked with RF power on.
2) Frequency programmed out of range.
3) RF power level uncalibrated with RF power on.
4) FM overmodulated with RF power on.

The Synthesizer sends this message by setting the service request line (SRQ) true. It will request service in local or remote whether or not it is addressed.

3-58. Sending the Status Byte Message

3-59. The Synthesizer sends the status byte when addressed to talk. This byte is the Synthesizer's response to a serial poll. The Synthesizer responds to a serial poll when the controller sends a serial poll enable command (SPE), then addresses the Synthesizer to talk. The SPE command enables the Synthesizer to clear the service request (SRQ) when addressed to talk. Also, when the Synthesizer receives its talk address, bit 7 of the status byte is latched. The Controller can then determine the status of the Synthesizer by converting the status byte to a decimal value. Status byte coding is as follows:

STATUS BYTE

Bit Number	8	7	6	5	4	3	2	1
Decimal Value	128	64	32	16	8	4	2	1
Function	CRYSTAL OVEN COLD	RSV REQUEST SERVICE	OUT OF RANGE (frequency)	RF OFF	NOT PHASE LOCKED	LEV UNCAL	FM OVER-MOD	+10 dBm OVER-RANGE

Sending the Status Byte Message (Cont'd)

3-60. The RSV (Request Service) bit is true whenever any of the four conditions that cause a request for service exists (even during the first 50 ms after a programming change). Once the Synthesizer is addressed to talk, the RSV line is latched even though the Synthesizer's need for service may have changed.

3-61. The status byte is useful for determining when a given programming change has been executed. For example, if the Synthesizer is addressed to talk immediately after a frequency change, the status byte can be used to determine when the Synthesizer has re-acquired lock. A frequency change might be followed by a status byte sequence of 72, 72, and then 64, indicating the Synthesizer is now locked.

3-62. Sending the Status Bit Message

3-63. The Synthesizer outputs a status bit on one of the Bus data lines in response to a parallel/poll (see controller manual). The line is switch selectable (see Section II) as is the level of the bit's logic. The status bit represents the RSV bit of the status byte.

3-64. Receiving the Abort Message

3-65. The Synthesizer stops talking or listening when it receives the Abort Message.

3-66. Programming Quick Reference Guide

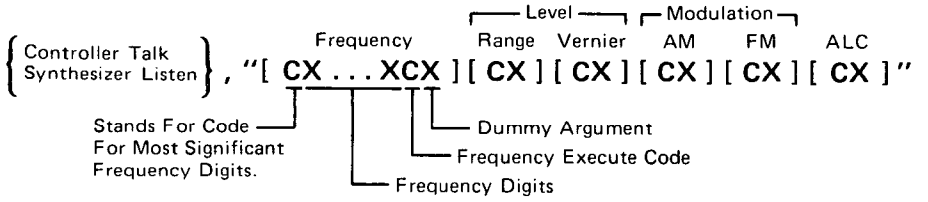
3-67. Table 3-10 shows program string syntax, program codes and arguments, and the status byte. All possible program codes (including equivalent duplicates) are shown, but the recommended codes are indicated with boldface type.

3-68. Programming Examples

3-69. Figure 3-7 is a flowchart showing how to program all of the Synthesizer functions and the twelve bus messages in HPL (9825 computing controller), and BASIC (9830 computing controller).

Table 3-10. Programming Quick Reference Guide

PROGRAM STRING SYNTAX



WHERE: **C** = PROGRAM CODE
X = ARGUMENT OR FREQUENCY DIGIT

	PROGRAM CODES	ARGUMENTS
FREQUENCY	10 GHz @ or **P** 1 GHz A or **Q** 100 MHz B or R 10 MHz C or S 1 MHz D or **T** 100 kHz E or **U** 10 kHz F or **V** 1 kHz G or **W** EXECUTE J or **Z**	Ø THROUGH 9
FM	**N** or ⌒	OFF 6 or 7 30 kHz 5 100 kHz 4 300 kHz 3 1 MHz 2 3 MHz 1 10 MHz Ø
ALC	**O** or _	RF OFF 0,2,4,6,8 INT NORMAL 1 INT, +10 RANGE 3 XTAL, NORMAL 5 XTAL,+10 RANGE 7 MTR, NORMAL < MTR,+10 RANGE > ?

	PROGRAM CODES	ARGUMENTS
OUTPUT LEVEL RANGE	**K** or [	0 dEm Ø −10 1 −20 2 −30 3 −40 4 −50 5 −60 6 −70 7 −80 8 −90 9 −100 : −110 ;
OUTPUT LEVEL VERNIER	**L** or \	+3 dB Ø +2 1 +1 2 0 3 −1 4 −2 5 −3 6 −4 7 −5 8 −6 9 −7 : −8 ; −9 < −10 =
AM	**M** or]	OFF 0 or 1 100% 2 30% 3

STATUS BYTE

Bit Number	8	7	6	5	4	3	2	1
Decimal Value	128	64	32	16	8	4	2	1
Function	CRYSTAL OVEN COLD	RSV REQUEST SERVICE	OUT OF RANGE (frequency)	RF OFF	NOT PHASE LOCKED	LEV UNCAL	FM OVER-MOD	+10 dBm OVER RANGE

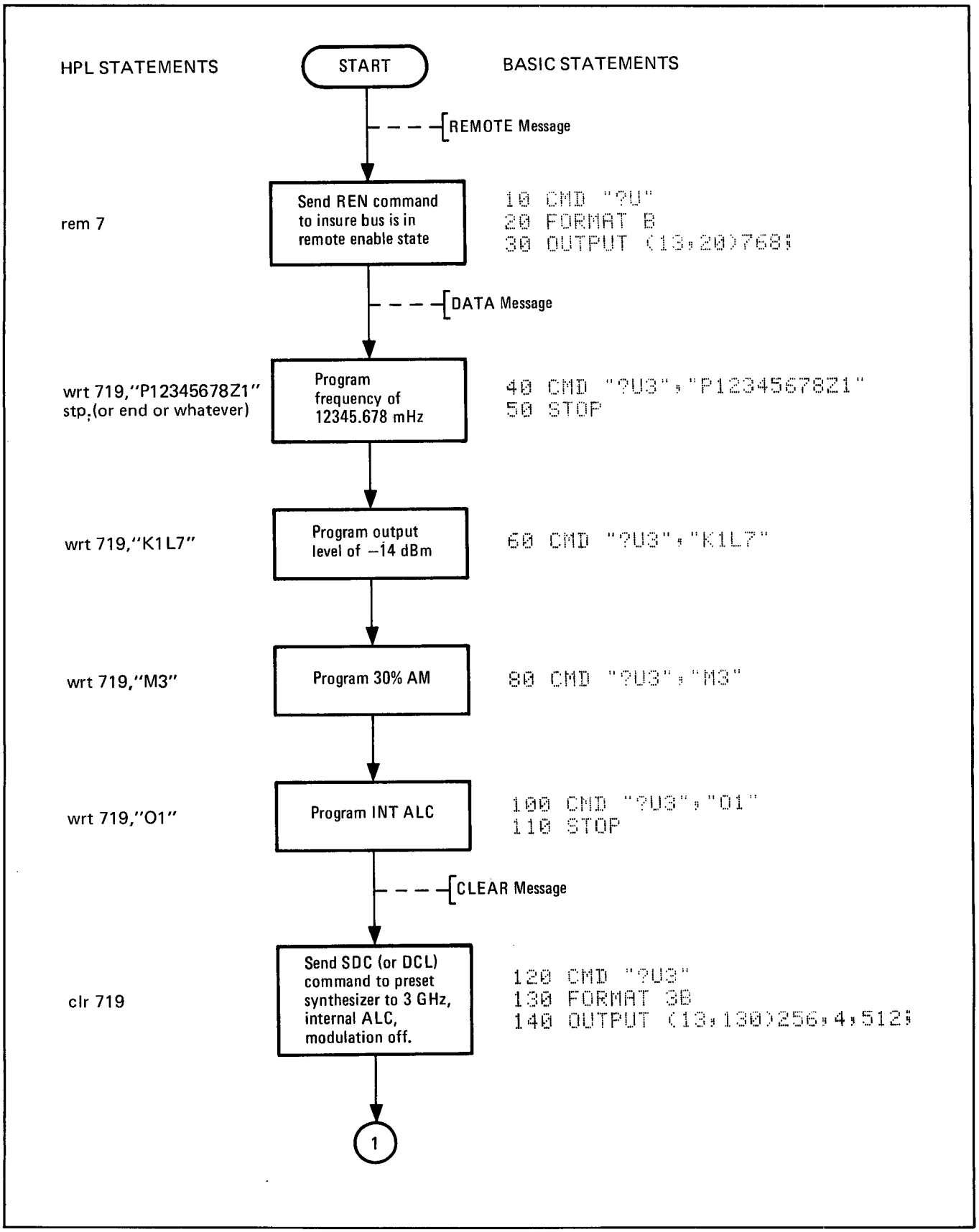


Figure 3-7. Programming Examples (1 of 2)

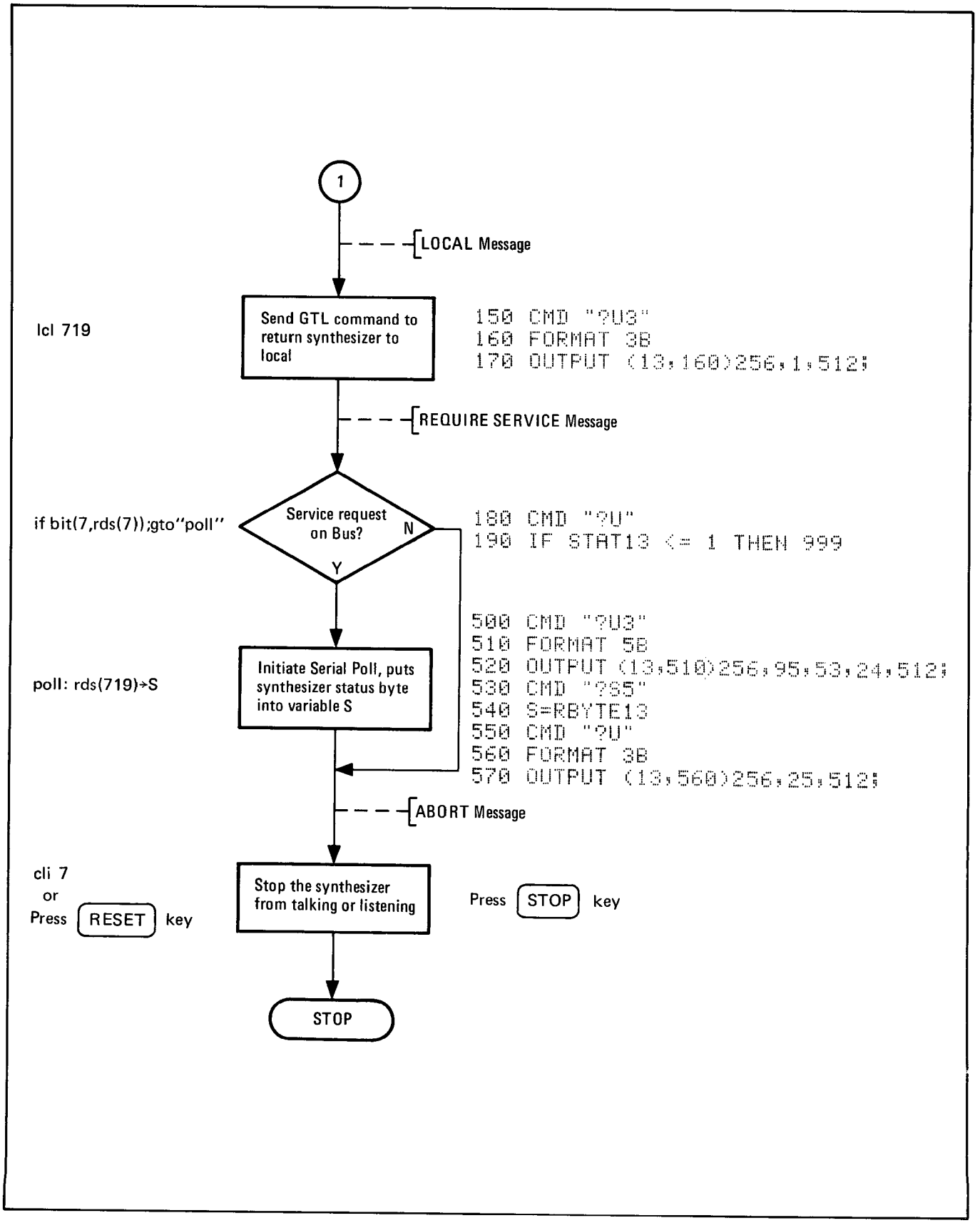


Figure 3-7. Programming Examples (2 of 2)

SECTION IV
PERFORMANCE TESTS

4-1. INTRODUCTION

4-2. The procedures in this section test the instrument's electrical performance using the specifications of Table 1-1 as the performance standards. All tests can be performed without access to the interior of the instrument. A simpler operational test is included in Section III under Operator's Checks.

NOTES

For ease of testing, the Frequency and Output Level Switching Time tests may be performed with top covers removed.

If the performance tests are to be considered valid the following conditions must be met:

a. *The Synthesizer must have a 1-hour warmup.*

b. *The line voltage must be within +5% and −10% of nominal.*

c. *The ambient temperature must be +15°C to +35°C for the Output Level Flatness and RF Output Level and Accuracy tests.*

Before aging rate tests are performed, the Synthesizer must 1) have a 30 day warm-up if it has been disconnected from the Mains power for more than 24 hours or 2) the Synthesizer must have a 24 hour warm-up if it has been disconnected from the Mains power for less than 24 hours.

4-3. EQUIPMENT REQUIRED

4-4. Equipment required for the performance tests is listed in the Recommended Test Equipment table in Section I. Any equipment that satisfies the critical specifications given in the table may be substituted for the recommended model(s).

4-5. TEST RECORD

4-6. Results of the performance tests may be tabulated on the Test Record at the end of the procedures. The Test Record lists all of the tested specifications and their acceptable limits. The results recorded at incoming inspection can be used for comparison in periodic maintenance and troubleshooting and after repairs or adjustments.

4-7. CALIBRATION CYCLE

4-8. This instrument requires periodic verification of performance. Depending on the use and environmental conditions, the instrument should be checked using the following performance test every six months after the first year.

4-9. ABBREVIATED PERFORMANCE TESTING

4-10. Performing the Operational Verification checks is suggested as an alternative to a complete verification of the specifications listed in Table 1-1. These checks give reasonable assurance that the Synthesizer is performing properly.

PERFORMANCE TESTS

4-11. OPERATIONAL VERIFICATION CHECKS

DESCRIPTION: This procedure checks the Synthesizer to give reasonable assurance that it is working properly by performing selected tests of all major functions. As each step is completed it may be checked off on Table 4-1. If remote verification is required, the Remote Operator's Check in Section VIII is recommended.

EQUIPMENT:

Spectrum Analyzer	8565A
Power Meter	436A/8481A
Test Oscillator	651B
Digital Voltmeter	3455A
Frequency Counter	5340A

PROCEDURE:

1. Connect the Synthesizer to the Mains power and allow sufficient warm-up time for the OVEN annunciator to go out.

2. Connect the power meter to the Synthesizer's RF OUTPUT. Set the Synthesizer's controls for 2 GHz, OUTPUT LEVEL RANGE to 0 dBm, OUTPUT LEVEL VERNIER control fully clockwise, the ALC switch to either XTAL or PWR MTR position and the METER mode switch should be in the LEVEL position. Under these conditions the Synthesizer should deliver maximum power, the panel meter should indicate zero and the LVL UNCAL annunciator should be lighted.

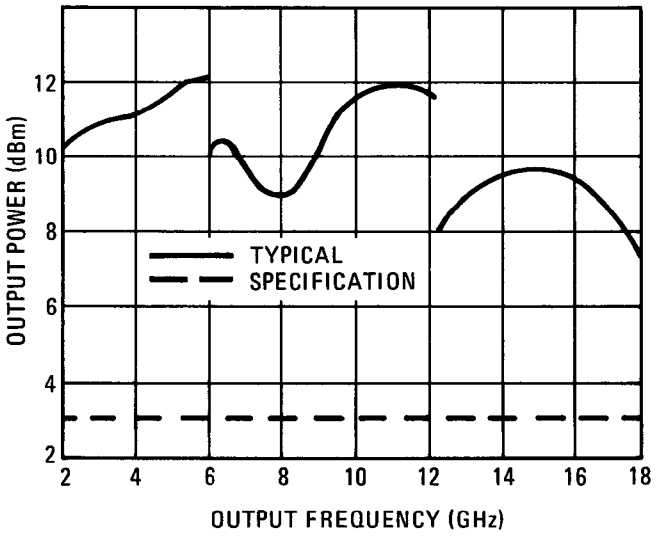


Figure 4-1. Typical Maximum Power Available on the +10 dBm Range (over-range)

3. Tune from 2 to 18.0 GHz in 100 MHz steps. The power should remain above +3 dBm over the entire frequency range. Figure 4-1 shows a typical output level curve. Be sure the NOT PHASE LOCKED annunciator is off before making power measurements.

PERFORMANCE TESTS

4-11. OPERATIONAL VERIFICATION CHECKS (Cont'd)

4. Set the ALC switch to INT. Adjust the VERNIER control to obtain a meter reading of 0 dBm. Tune in 100 MHz steps from 2 to 18.0 GHz. The LVL UNCAL annunciator is not lighted and the total power variation should be within the following limits.
   2—6.2 GHz ±0.75 dB
   6.2—12.4 GHz ±1 dB
   12.4—18.0 GHz ±1.25 dB

5. Set the Synthesizer frequency to 2 GHz and adjust the VERNIER control to obtain 0 dBm as indicated on the power meter.

6. Connect the spectrum analyzer to the Synthesizer's RF OUTPUT in place of the power meter. Tune the spectrum analyzer to observe the 2 GHz signal. Adjust the spectrum analyzer's log reference level to place the signal at the top graticule line.

7. Change the Synthesizer's OUTPUT LEVEL RANGE switch from 0 dBm to −80 dBm in 10 dB steps. Verify that the change per step is, in fact, 10 dB. This is to assure that each section of the output attenuator is switching properly, however it does not rigorously test operation to specifications.

8. Set the OUTPUT LEVEL RANGE to −10 dBm, the meter switch to FM and connect a 100 kHz signal from a test oscillator's 50 ohm output to the FM INPUT. connector. Set the FM DEVIATION switch to the 0.3 MHz range. Adjust the test oscillator's output level to obtain the first Bessel null of the carrier. This should occur between 0.517 Vrms and 0.616 Vrms for ambient temperatures between 15°C and 35°C. The front panel meter should indicate between 210 and 270 kHz deviation.

9. Set the FM DEVIATION switch to OFF and disconnect the input signal. Set the METER MODE switch to AM, set the AM function switch to the 100% range and connect a 10 kHz signal (from the 600 ohm output of the test oscillator) to the AM INPUT connector. Set the spectrum analyzer vertical sensitivity per division switch to 2 dB log. Adjust the log reference level to place the carrier on the top graticule line.

10. Adjust the test oscillator's output level to place the first sidebands 10 dB below the carrier. This should occur at a test oscillator output level between 0.416 Vrms and 0.478 Vrms. The meter should indicate between 53.25% and 73.25% (63.25% nominal) for ambient temperatures between 15°C and 35°C.

11. If any of the steps in this procedure seem to have failed, perform the related performance tests or refer to the service information in Section VIII as necessary.

PERFORMANCE TESTS

4-11. OPERATIONAL VERIFICATION CHECKS (Cont'd)

Table 4-1. Record of Operational Verification Checks

Step	Description	Results
1.	OVEN annunciator is not lighted.	_____
2.	Panel meter indicates zero (LEVELED) LVL UNCAL ANNUNCIATOR IS LIGHTED.	_____ _____
3.	The NOT PHASE LOCKED annunciator is not lighted.	_____
4.	The LVL UNCAL annunciator is not lighted. Power variation (leveled flatness) is: ±0.75 dB maximum from 2.0 to 6.2 GHz ±1.00 dB maximum from 6.2 to 12.4 GHz ±1.25 dB maximum from 12.4 to 18.0 GHz	_____ _____ _____ _____
7.	OUTPUT LEVEL change is about 10 dB for each OUTPUT LEVEL RANGE switch setting from 0 to −80 dBm.	_____
8.	Frequency Modulation drive voltage is within tolerance. Frequency Modulation metering accuracy is within tolerance.	_____ _____
10.	Amplitude Modulation drive voltage is within tolerance Amplitude Modulation metering accuracy is within tolerance.	_____ _____

4-12. OUTPUT LEVEL FLATNESS

SPECIFICATION: (0 dBm range; +15°C to +35°C)
±0.75 dB, 2.0 to 6.2 GHz
±1.00 dB, 2.0 to 12.4 GHz
±1.25 dB, 2.0 to 18.0 GHz

For Options 004 and 005 instruments, flatness is degraded by an additional ±0.25 dB. Applies for internal leveling only.

DESCRIPTION: A power meter is used to measure the output power as the Synthesizer frequency is tuned across the range of 2 GHz to 18 GHz. The test may be performed in either the remote or local mode.

EQUIPMENT: Power Meter/Sensor . . . . . HP 436A/8481A

PERFORMANCE TESTS

4-12. OUTPUT LEVEL FLATNESS (Cont'd)

PROCEDURE:

1. Calibrate and zero the power meter.
2. Press the Synthesizer's PRESET (3 GHz) pushbutton.
3. Set the OUTPUT LEVEL RANGE switch to 0 dBm.
4. Connect the power sensor to the RF OUTPUT connector.
5. Adjust the OUTPUT LEVEL VERNIER control for a level of +3 dBm as indicated by the power meter. DO NOT change the VERNIER CONTROL setting until this procedure is completed.
6. Tune the Synthesizer in 1 MHz steps over the frequency range. Record the maximum and minimum power outputs. BE SURE to change the power meter's calibration factor as the frequency is changed.

NOTE

The plus and minus specification for output power is not referenced to a particular frequency. The specification rather, represents the total power variation over the entire frequency range.

2.0 — 6.2 GHz	±0.75 dB	Minimum_____		
		Maximum_____		
		Total Variation	_____	1.50 dB
2.0 — 12.4 GHz	±1.00 dB	Minimum_____		
		Maximum_____		
		Total Variation	_____	2.00 dB
2.0 — 18.0 GHz	±1.25 dB	Minimum_____		
		Maximum_____		
		Total Variation	_____	2.50 dB

7. If the Output Level flatness is not within the required tolerance, perform the ALC adjustments in Section V.

4-13. HARMONICS AND SUBHARMONICS

SPECIFICATIONS: All harmonics up to 18 GHz and subharmonics and multiples up to 18 GHz shall be better than —25 dBc.

DESCRIPTION: A comparison of amplitude levels of the naromics and subharmonics to the fundamental signal are to be made. A reference level for the Synthesizer's carrier signal is established by viewing the output on the spectrum analyzer's display. The Synthesizer is then tuned to another frequency so that a harmonic or subharmonic of this new signal is viewed on the display and is compared to the carrier signal level. Various signals are viewed to verify proper performance.

PERFORMANCE TESTS

4-13. HARMONICS AND SUBHARMONICS (Cont'd)

EQUIPMENT: Spectrum Analyzer . . . . . HP 8565A

PROCEDURE:

1. Set the Synthesizer's OUTPUT LEVEL RANGE switch to 0 dBm and VERNIER control for a meter reading of +3 dB. Tune to 4000 ~~Hz~~.
2. Connect the Synthesizer's RF OUTPUT to the spectrum analyzer's RF input.
3. Set the spectrum analyzer's control to display the fundamental signal. Set the resolution bandwidth to 10 kHz and the input attenuation to 40 dB. Adjust the log reference level to set the signal at the top graticule line of the display.
4. Tune the Synthesizer's frequency to 2000 MHz. The second harmonic signal viewed on the analyzer's display should be greater than 25 dB below the reference. Record the harmonic signals amplitude.

   25 dB _____
5. Tune the Synthesizer and spectrum analyzer to 6000 MHz. Adjust the analyzer's log reference level to set the fundamental signal to the top graticule line.
6. Tune the Synthesizer to 3000 MHz. The second harmonic should be greater than 25 dB below the reference. Record the signal level.

   25 dB _____
7. Tune the Synthesizer to 2000 MHz. The third harmonic should be greater than 25 dB below reference. Record the signal level.

   25 dB _____
8. Tune the Synthesizer and spectrum analyzer to 4133.334 MHz. Adjust the log reference level to set fundamental signal to the top graticule line.
9. Tune the Synthesizer to 8266.668 MHz. The ½f subharmonic (fundamental feedthrough) on the spectrum analyzer should be greater than 25 dB down. Record the signal level.

   25 dB _____
10. Tune the Synthesizer to 12 400.002 MHz. The 1/3f subharmonic should be greater than 25 dB down. Record the signal level.

    25 dB _____
11. Tune the Synthesizer and spectrum analyzer to 8266.668 MHz. Adjust the log reference level to set the fundamental signal to the top graticule line.
12. Tune the Synthesizer to 12 400.002 MHz. The 2/3f subharmonic should be greater than 25 dB down. Record the signal level.

    25 dB _____

NOTE

This procedure may be repeated at any frequency of interest within the specification limits of 2000 MHz to 18 000 MHz.

13. If the harmonics and subharmonics are not within tolerance, perform the YTM and ALC adjustments in Section V.

PERFORMANCE TESTS

4-14. SWR

SPECIFICATIONS: Impedance: 50 ohms

SWR: <2.5. On 0 dBm and −10 dBm output level ranges specification applies only at the RF output frequency.

DESCRIPTION: The insertion loss of the directional coupler is measured. From the insertion loss and the SWR specification, the maximum allowable power variation is calculated (assuming that the Synthesizer is operating into a short circuit). The Synthesizer is then operated into a short and the power variation is measured and compared with the calculated limits.

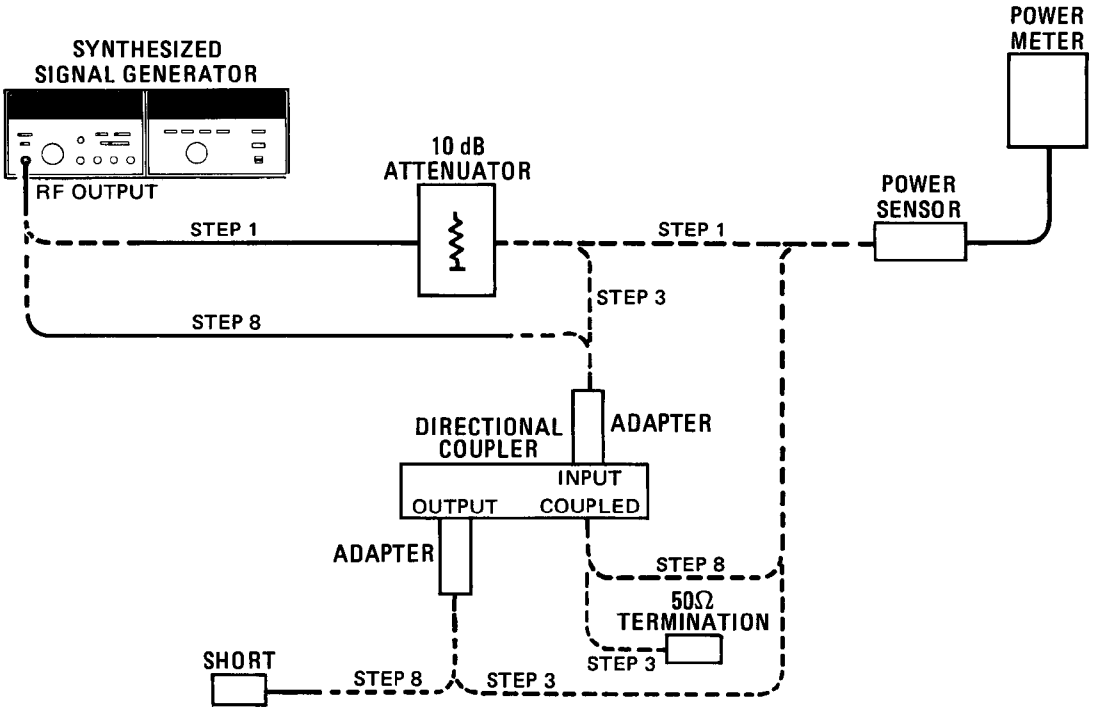


Figure 4-2. SWR Test Setup

EQUIPMENT:

10 dB Attenuator	HP 8491B Option 010
Adapter, APC-7 to Type-N Male (2 req'd)	HP 11525A
50 Ohm Termination, APC-7	HP 909A Option 12
Short, APC-7	HP 11565A
Directional Coupler	HP 11691D
Power Meter/Sensor	HP 436A/8484A

PROCEDURE:

1. Set Synthesizer's controls for an output of 3 GHz at −12 dBm, connect the 10 dB attenuator to Synthesizer's RF OUTPUT connector and measure the power output with the power meter. See Figure 4-2, Step 1.

   3 GHz _____ dBm

NOTE

For reliable results, DO NOT CHANGE the Synthesizer's OUTPUT LEVEL RANGE switch or VERNIER control settings for the remainder of this test.

PERFORMANCE TESTS

4-14. SWR (Cont'd)

2. Repeat the measurement at 3 GHz intervals to 18 GHz.

   6 GHz _____ dBm
   9 GHz _____ dBm
   12 GHz _____ dBm
   15 GHz _____ dBm
   18 GHz _____ dBm

3. Connect the equipment as shown in Figure 4-2 (step 3).

4. Measure the power at the same frequencies as in steps 1 and 2.

   3 GHz _____ dBm
   6 GHz _____ dBm
   9 GHz _____ dBm
   12 GHz _____ dBm
   15 GHz _____ dBm
   18 GHz _____ dBm

5. Compute the insertion loss (I) of the directional coupler and adapters for each frequency (step 1 or 2 minus step 4).

   3 GHz _____ dB
   6 GHz _____ dB
   9 GHz _____ dB
   12 GHz _____ dB
   15 GHz _____ dB
   18 GHz _____ dB

6. Calculate the gain of the coupler and the ratio of maximum to minimum power for SWR of 2.5 at each listed frequency. Use the following formulas:

$$G = 10^{(-I/20)}$$

$$R = \frac{1 + G^2/2.32}{1 - G^2/2.32}$$

Where G = gain of Coupler
I = insertion loss (recorded in step 5)
R = ratio of maximum to minimum power.

PERFORMANCE TESTS

4-14. SWR (Cont'd)

3 GHz G = _____ R = _____
6 GHz G = _____ R = _____
9 GHz G = _____ R = _____
12 GHz G = _____ R = _____
15 GHz G = _____ R= _____
18 GHz G = _____ R = _____

7. Convert the ratio R to the maximum variation allowable (in dB) by using the formula:

$$S = 20 \log_{10} R$$

Where S = maximum variation (dB)
and R = ratio of maximum to minimum ~~power~~.

3 GHz S = _____
6 GHz S = _____
9 GHz S = _____
12 GHz S = _____
15 GHz S = _____
18 GHz S = _____

8. Connect equipment as shown in Figure 4-2 (step 8).

9. To verify the Synthesizer's SWR, slowly tune around 3 GHz to find the minimum and maximum power indications. Record the power indications and figure the variation.

	MAXIMUM		MINIMUM		VARIATION
3 GHz	_____	dBm −	_____	dBm =	_____
6 GHz	_____	dBm −	_____	dBm =	_____
9 GHz	_____	dBm −	_____	dBm =	_____
12 GHz	_____	dBm −	_____	dBm =	_____
15 GHz	_____	dBm −	_____	dBm =	_____
18 GHz	_____	dBm −	_____	dBm =	_____

10. Repeat the search for maxima and minima at the other frequencies. The variation at each frequency should be less than the value of S computed in step 7.

If the SWR specification is not within tolerance, refer to the troubleshooting information in Section VIII, Service Sheet 4.

PERFORMANCE TESTS

4-15. FM ACCURACY

SPECIFICATION: FM indicated meter accuracy (at 100 kHz rate): ±10% full scale at +15 to +35°C; ±15% of full scale from 0 to 55°C.

FM accuracy relative to external input level (at 100 kHz rate): ±7% range at +15 to +35°C; ±10% of range from 0 to 55°C.

NOTE

For FM rates other than 100 kHz, add the FM frequency response specification.

DESCRIPTION: With the FM rate fixed, the FM peak deviation is varied to produce a carrier null. Because the FM rate is fixed, the peak deviation is known at the null. The meter indication of peak deviation and the modulation drive level should be within their specified tolerances.

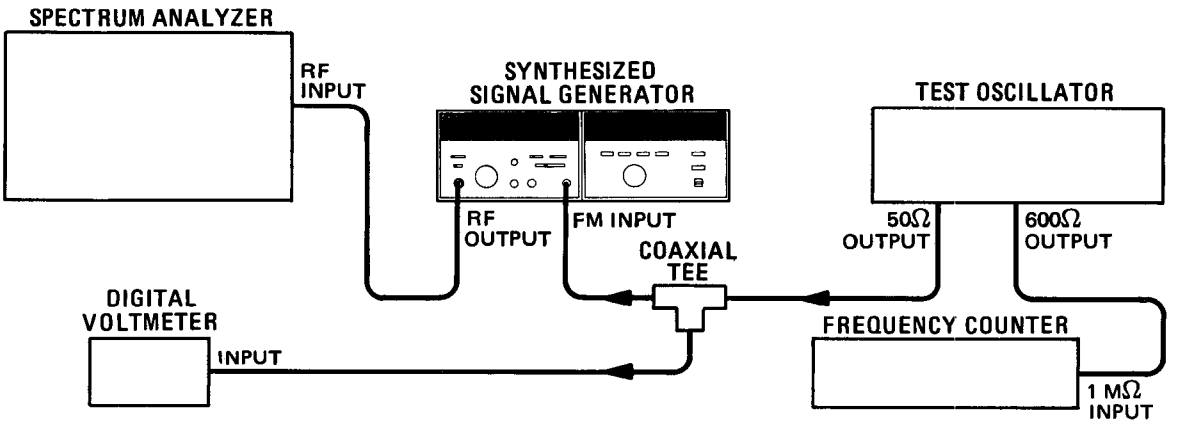


Figure 4-3. FM Accuracy Test Setup

EQUIPMENT:

Frequency Counter	HP 5340A
Test Oscillator	HP 651B
Digital Voltmeter	HP 3455A
Spectrum Analyzer	HP 8565A

PROCEDURE:

1. Connect the equipment as shown in Figure 4-3.
2. Set the test oscillator's output to 100 kHz as accurately as possible.
3. Tune the Synthesizer to 3000 MHz at −10 dBm. Adjust the spectrum analyzer controls for a clear display of the carrier.
4. Set the Synthesizer's FM DEVIATION switch to the 0.3 MHz range; set the METER MODE switch to FM.

PERFORMANCE TESTS

4-15. FM ACCURACY (Cont'd)

5. Adjust the test oscillator's output level to obtain a carrier null. (This should occur near 0.56 Vrms.)

6. The Synthesizer's front panel meter should read between 2.10 and 2.70 (240 kHz peak deviation). Record the reading.

   210 _____ 270 kHz-pk

7. The DVM should read between 0.53 and 0.61 Vrms. Record the level.

   0.53 _____ 0.61 Vrms

8. If the FM Accuracy is not within tolerance, perform the FM Driver Adjustment and the FM Adjustments in Section V.

4-16. AM DISTORTION

SPECIFICATION: For rates less than 10 kHz, for meter readings 0 db and below and from +15°C to +35°C.
less than 3% at 30% depth
less than 4% at 50% depth
less than 5% at 75% depth.

DESCRIPTION: The amplitude modulated output of the Synthesizer is detected by a spectrum analyzer (zero frequency span per division). The distortion present on the detected signal (at the vertical output) is displayed on a low frequency spectrum analyzer.

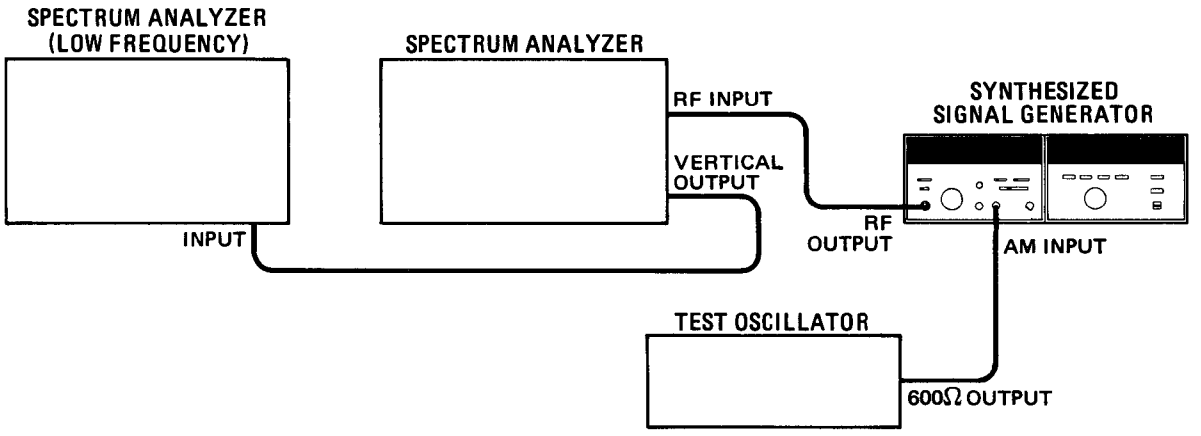


Figure 4-4. AM Distortion Test Setup

EQUIPMENT:
Spectrum Analyzer . . . . . HP 8565A
Spectrum Analyzer
(Low Frequency) . . . . . HP 3580A
Test Oscillator . . . . . HP 651B

PROCEDURE: 1. Set the test oscillator's controls to 1 kHz at approximately 0.7 Vrms.

PERFORMANCE TESTS

4-16. AM DISTORTION (Cont'd)

2. Tune the Synthesizer to 3000 MHz at an OUTPUT LEVEL of −10 dBm.

3. Set the Synthesizer's AM function switch to 30% and the METER MODE switch to AM.

4. Connect the test oscillator's 600 ohm output to the Synthesizer's AM input. Adjust the level as needed to obtain a meter reading of 30% AM.

5. Connect the Synthesizer's RF OUTPUT to the spectrum analyzer's input.

6. Set the spectrum analyzer's input attenuation to 30 dB and tune to center the 3000 MHz signal.

7. Set the resolution bandwidth to 300 kHz, frequency span to zero, vertical display to linear, trigger to video and video filter off.

8. Adjust the spectrum analyzer's vertical sensitivity controls to place the demodulated waveform near top of the display.

9. Connect the low frequency spectrum analyzer's input to the spectrum analyzer's vertical output connector.

10. Set the low frequency analyzer's controls to observe the fundamental and three harmonics of the detected signal.

11. Record the AM harmonic levels relative to the fundamental (dB down) as measured on the low frequency analyzer's display.

Percentage Distortion at 30% AM Depth

Harmonic	AM Harmonic Levels (dB down from fundamental)	Power Ratio
second	_____	_____
third	_____	_____
fourth	_____	_____
total		_____

12. To determine the percentage distortion, first convert each significant harmonic level from dB down from the fundamental to the power ratio using Table 4-2. Then add the power ratios. Use the table to convert from the total power ratio to percent distortion. The distortion level should be less than 3%. Record the level.

_____3%

13. Set the Synthesizer's AM function switch to 100%.

14. Adjust the test oscillator's output level to obtain a meter reading of 50% AM.

PERFORMANCE TESTS

4-16. AM DISTORTION (Cont'd)

15. Adjust the spectrum analyzer's vertical sensitivity controls to place the demodulated waveform near the top of the display.

16. Set the low frequency spectrum analyzer's controls to observe the fundamental and three harmonics of the detected signal.

17. Record the AM harmonic levels relative to the fundamental.

Percentage Distortion at 50% AM Depth

Harmonic	Harmonic Levels (dB down from Fundamental)	Power Ratio
second	_____	_____
third	_____	_____
fourth	_____	_____
total		_____

18. Using Table 4-2 determine the total power ratio of the harmonics as in step 12. The distortion should be less than 4%. Record the level.

_____ 4%

19. Adjust the test oscillator's output level to obtain a meter reading of 75% AM.

20. Adjust the spectrum analyzer's vertical sensitivity controls to place the demodulated waveform near the top of the display.

21. Set the low frequency spectrum analyzer's controls to observe the fundamental and three harmonics of the detected signal.

22. Record the AM harmonic levels relative to the fundamental.

Percentage Distortion at 75% AM Depth

Harmonic	Harmonic Levels (dB down from Fundamental)	Power Ratio
second	_____	_____
third	_____	_____
fourth	_____	_____
total		_____

23. Using Table 4-2 determine the total power ratio of the harmonics as in step 12. The distortion should be less than 5%. Record the level.

_____ 5%

24. If the AM Distortion is not within tolerance, refer to the troubleshooting information in Section VIII. Service Sheet 4.

PERFORMANCE TESTS

4-16. AM DISTORTION (Cont'd)

Table 4-2. Harmonic Level versus Percentage Distortion

Ratio to Fundamental (dB)	Power Ratio	Distortion (%)	Ratio to Fundamental (dB)	Power Ratio	Distortion (%)
0	1.000000000	100.000	−31	0.000794328	2.818
−1	0.794328235	89.125	−32	0.000630957	2.512
−2	0.630957344	79.433	−33	0.000501187	2.239
−3	0.501187234	70.795	−34	0.000398107	1.995
−4	0.398107171	63.096	−35	0.000316228	1.778
−5	0.316227766	56.234	−36	0.000251189	1.585
−6	0.251188643	50.119	−37	0.000199526	1.413
−7	0.199526231	44.668	−38	0.000158489	1.259
−8	0.158489219	39.811	−39	0.000125893	1.122
−9	0.125892541	35.481	−40	0.000100000	1.000
−10	0.100000000	31.623	−41	0.000079433	0.891
−11	0.079432823	28.184	−42	0.000063096	0.794
−12	0.063095734	25.119	−43	0.000050119	0.708
−13	0.050118723	22.387	−44	0.000039811	0.631
−14	0.039810717	19.953	−45	0.000031623	0.562
−15	0.031622777	17.783	−46	0.000025119	0.501
−16	0.025118864	15.849	−47	0.000019953	0.447
−17	0.019952623	14.125	−48	0.000015849	0.398
−18	0.015848932	12.589	−49	0.000012589	0.355
−19	0.012589254	11.220	−50	0.000010000	0.316
−20	0.010000000	10.000	−51	0.000007943	0.282
−21	0.007943282	8.913	−52	0.000006310	0.251
−22	0.006309573	7.943	−53	0.000005012	0.224
−23	0.005011872	7.079	−54	0.000003981	0.200
−24	0.003981072	6.310	−55	0.000003162	0.178
−25	0.003162278	5.623	−56	0.000002512	0.158
−26	0.002511886	5.012	−57	0.000001995	0.141
−27	0.001995262	4.467	−58	0.000001585	0.126
−28	0.001584893	3.981	−59	0.000001259	0.112
−29	0.001258925	3.548	−60	0.000001000	0.100
−30	0.001000000	3.162			

PERFORMANCE TESTS

4-17. AMPLITUDE MODULATION DEPTH, METER ACCURACY, AND INPUT ACCURACY

SPECIFICATIONS: **AM Depth** for meter readings of 0 dB and below. The power specified is carrier power only (i.e., does not include the power in the AM sidebands).

0—75%, 2.0—6.2 GHz
0—60%, 6.2—12.4 GHz
0—50%, 12.4—18.0 GHz

Sensitivity (percent AM per Vpk): 30%/V and 100%/V ranges. Maximum input 1.0 Vpeak into 600 ohms nominal (1.0 Vpeak gives maximum depth on each range. AM depth is linearly controlled by varying input level between 0 and 1 volt peak.)

Indicated Meter Accuracy (100 Hz to 10 kHz rates): ±5% of range.

Accuracy Relative to EXT AM Input Level (100 Hz to 10 kHz rates): ±10% of range.

DESCRIPTION: The specified parameters are tested by measuring the modulation level and comparing it to the modulation level meter reading and input drive voltage. A spectrum analyzer is used to detect the modulation signal in the zero scan mode. The analyzer's vertical output is calibrated to provide an accurate measure of AM level (% AM is half the vertical output voltage in mVrms).

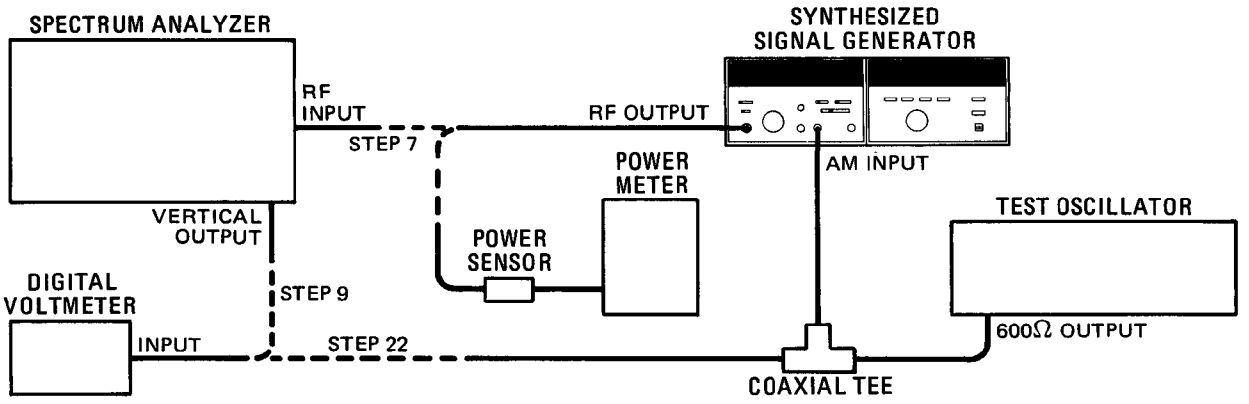


Figure 4-5. AmplitudeModulation Depth Meter Accuracy and Input Accuracy Test Setup

EQUIPMENT:

Spectrum Analyzer	HP 8565A
Digital Voltmeter	HP 3455A
Test Oscillator	HP 651B
Power Meter	HP 436A/8484A

PROCEDURE:

1. Set the Synthesizer's controls as follows:

METER MODE switch	LEVEL
RF switch	ON
OUTPUT LEVEL RANGE switch	−30 dBm
OUTPUT LEVEL VERNIER control (adjusted for meter reading).	+3 dB
ALC mode switch	INT
AM function switch	OFF
FM DEVIATION switch	OFF

PERFORMANCE TESTS

4-17. AMPLITUDE MODULATION DEPTH METER ACCURACY AND INPUT ACCURACY (Cont'd)

NOTE

Do not change the VERNIER control setting for the remainder of this test.

2. Press the PRESET (3 GHz) pushbutton.

3. Connect the power meter to the Synthesizer's RF OUTPUT connector. Record the output power.

   P_1 = _____ dBm

4. Set the Synthesizer's OUTPUT LEVEL RANGE switch to −50 dBm. Record the output power.

   P_2 = _____ dBm

5. Calculate a value for α using the following formula or look up the value in Table 4-3.

$$\alpha = 10^{(P_2 - P_1)/20}$$

Table 4-3. Modulation Index

$P_2 - P_1$	Alpha (α)	$P_2 - P_1$	Alpha (α)
−18.0	0.1259	−20.0	0.1000
−18.1	0.1245	−20.1	0.0989
−18.2	0.1230	−20.2	0.0977
−18.3	0.1216	−20.3	0.0966
−18.4	0.1202	−20.4	0.0955
−18.5	0.1189	−20.5	0.0944
−18.6	0.1175	−30.6	0.0933
−18.7	0.1161	−20.7	0.0923
−18.8	0.1148	−20.8	0.0912
−18.9	0.1135	−20.9	0.0902
−19.0	0.1122	−21.0	0.0891
−19.1	0.1109	−21.1	0.0881
−19.2	0.1096	−21.2	0.0871
−19.3	0.1084	−21.3	0.0861
−19.4	0.1072	−21.4	0.0851
−19.5	0.1059	−21.5	0.0841
−19.6	0.1047	−21.6	0.0832
−19.7	0.1035	−21.7	0.0822
−19.8	0.1023	−21.8	0.0813
−19.9	0.1012	−21.9	0.0804
		−22.0	0.0794

PERFORMANCE TESTS

4-17. AMPLITUDE MODULATION DEPTH METER ACCURACY AND INPUT ACCURACY (Cont'd)

6. Set the spectrum analyzer's controls for a center frequency of 3 GHz, frequency span per division 20 kHz, resolution bandwidth 300 kHz, input attenuation 30 dB, vertical sensitivity linear, and set the tuning stabilizer to on. Set the video filter to off.

7. Connect the Synthesizer's RF OUTPUT to the spectrum analyzer's RF input. Connect the Synthesizer's AM INPUT to the test oscillator's 600Ω output through a coaxial tee.

8. Reset the Synthesizer's OUTPUT LEVEL RANGE switch to −30 dBm.

9. Connect the DVM to the spectrum analyzer's vertical output.

10. Fine tune the spectrum analyzer to center the signal on the display.

11. Set the spectrum analyzer to zero scan.

12. Fine tune the analyzer to peak the signal on the display.

13. Adjust the spectrum analyzer's reference level controls to obtain +500 mVdc on the DVM (V_{DET1}).

14. Decrease the Synthesizer's RF output power by 20 dB. Note DVM reading.

V_{DET2} = _____ mVdc

15. Calculate the offset voltage from the following expressions:

$$V_{OFF} = \frac{V_{DET2} - \alpha V_{DET1}}{1 - \alpha}$$

where V_{OFF} = offset voltage

V_{DET1} = detected dc voltage at V_{RF1}

V_{DET2} = detected dc voltages at V_{RF2}

α = ratio of V_{RF2} to V_{RF1}

V_{RF1} = RF OUTPUT voltage

V_{RF2} = attenuated RF OUTPUT voltage

16. Set the Synthesizer's OUTPUT LEVEL RANGE to −30 dBm.

17. To calibrate the spectrum analyzer for amplitude modulation level measurement, use the reference level controls to set +282.8 mVdc + V_{OFF} at vertical output (as measured on DVM). For example, if V_{OFF} is −2 mV then set +282.8 mV + (−2 mV) or +280.8 mV at the vertical output. Be sure the trace is peaked on the display when setting the voltage.

PERFORMANCE TESTS

4-17. AMPLITUDE MODULATION DEPTH METER ACCURACY AND INPUT ACCURACY (Cont'd)

18. Set the DVM to measure mVrms. The AM depth may now be calculated according to the following expression:

$$\text{AM Depth (\%)} = \frac{\text{DVM Reading (mVrms)}}{2}$$

19. Set the Synthesizer's METER MODE switch to AM and AM switch to 100%.

20. Set the test oscillator's controls to obtain an AM meter reading of 75% at a 1 kHz rate. Record the DVM reading in the table.

Detected AM Signal

AM Level	Synthesizer RF Output (MHz)	DVM Reading (mVrms)		
		Min.	Actual	Max.
75%	3 000	140	_____	160
60%	7 000	110	_____	130
50%	13 000	90	_____	110

21. Adjust the test oscillator's output level control for a DVM reading of 150 mVrms (75% AM level).

22. Connect the DVM input to the open port of the coaxial tee. Measure and record the modulation drive signal.

AM Drive Signal

AM Level	Preset DVM Level (mVrms)	DVM Reading (mVrms)		
		Min.	Actual	Max.
75%	150	460	_____	601
60%	120	354	_____	495
50%	100	283	_____	424

23. Repeat steps 6 through 19 using a Synthesizer output of 7000 MHz and an AM level of 60%. Record the DVM readings in the tables.

PERFORMANCE TESTS

4-17. AMPLITUDE MODULATION DEPTH METER ACCURACY AND INPUT ACCURACY (Cont'd)

24. Repeat steps 6 through 19 using a Synthesizer output of 13 000 MHz and an AM level of 50%. Record the DVM readings in the tables.

25. Connect the DVM to the spectrum analyzer's vertical output.

26. Set the Synthesizer's AM switch to 30%.

27. Set the test oscillator's output level controls to obtain an AM meter reading of 30%. Verify that the DVM reading is 60.0 ± 3.0 mVrms.

    57.0 _____ 63.0 mVrms

28. Connect the DVM input to the open port of the coaxial tee. Verify that the DVM reading is 707 ±71 mVrms.

    636 _____ 778 mVrms

29. If the meter accuracy is not within tolerance, perform the AM Meter Adjustment in Section V. If the input accuracy is not within tolerance, refer to the trouble-shooting information in Section VIII, Service Sheet 4.

4-18. NON-HARMONICALLY RELATED SPURIOUS (CW AND AM MODES)

SPECIFICATION:

<—70 dB, 2.0—6.2 GHz
<—64 dB, 6.2—12.4 GHz
<—60 dB, 12.4—18.0 GHz

External FM modulation signals at rates <100 kHz must be disconnected.

DESCRIPTION: The spectrum analyzer is calibrated by setting the carrier to the top graticule line. The Synthesizer's RF output level is increased. The spectrum analyzer is tuned to any frequency between 2 and 18 GHz in search of spurious signals.

NOTE

The non-harmonically related spurious signals will always increase in amplitude above 6.2 GHz due to multiplication in the YIG tuned multiplier. The increase is determined by a strict mathematical relationship. Therefore, if the specification is met in the range 2—6.2 GHz, it will always meet the less stringent specification in the multiplied ranges, that is, from 6.2—18.0 GHz.

PERFORMANCE TESTS

4-18. NON-HARMONICALLY RELATED SPURIOUS (CW AND AM MODES) (Cont'd)

EQUIPMENT: Spectrum Analyzer . . . . . HP 8565A

PROCEDURE:

1. Connect the Synthesizer's RF OUTPUT to the spectrum analyzer's input.
2. Set the Synthesizer's OUTPUT LEVEL controls for −47 dBm (−50 dBm RANGE and a +3 dB meter reading); tune to 3000 MHz.
3. Tune the spectrum analyzer's center frequency to view the carrier. Set frequency to 10 kHz per division, resolution bandwidth to 1 kHz and sweep time as needed to maintain spectrum analyzer calibration. Set the video filter to 100 Hz (0.1 times the resolution bandwidth).
4. Adjust the reference level control to place the carrier at the top graticule line.
5. Increase the Synthesizer's output power to +3 dBm. Do not readjust the spectrum analyzer amplitude calibration.
6. Tune the spectrum analyzer to any desired frequency in search of non-harmonically related spurious signals. Verify that any signals found are non-harmonically related and not generated by the spectrum analyzer. Verify that the spurious signals are below specified limits.
7. If the non-harmonically related spurious are not within tolerance, refer to the troubleshooting information in Section VIII, Service Sheet 1.

4-19. POWER LINE RELATED SPURIOUS (CW AND AM MODES)

SPECIFICATION: Due to fan rotation within 5 Hz below line frequency and multiples, except Option 003 instruments (400 Hz operation):

Center Frequency Range (F_c)	Power Line Related and Spurious Levels at frequency offset (f_o) from carrier (F_c)		
	f_o <300 Hz	300 Hz ≤f_o≤1 kHz	f_o > 1 kHz
2.0—6.2 GHz	−50 dBc	−60 dBc	−65 dBc
6.2—12.4 GHz	−44 dBc	−54 dBc	−59 dBc
12.4—18.0 GHz	−40 dBc	−50 dBc	−55 dBc

NOTE

For Option 003 instrument (400 Hz operation) refer to Table 1-1.

DESCRIPTION: The Unit Under Test is isolated from vibration on a two-inch thick foam pad. The primary power source is separate from the power source for the reference unit and spectrum analyzer. The outputs of the Unit Under Test and reference unit are mixed together. The IF output is connected to the input of the low frequency spectrum analyzer. The line related sidebands are observed on the analyzer display.

PERFORMANCE TESTS

4-19. POWER LINE RELATED SPURIOUS (CW AND AM MODES) (Cont'd)

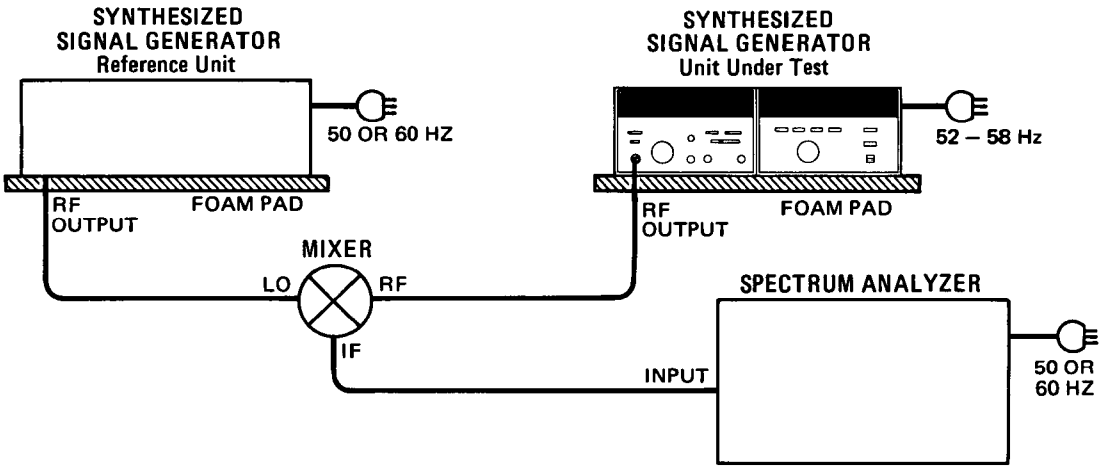


Figure 4-6. Power Line Related Spurious Test Setup

NOTE

The Unit Under Test must be operated at a line (Mains) power frequency different than that of the reference unit and spectrum analyzer. This avoids the summing of the power line spurious signals.

EQUIPMENT:

Synthesized Signal Generator	HP 8672A
Mixer	RHG DM1-18
Spectrum Analyzer	HP 3580A
Foam Pads	--

PROCEDURE:

1. Set the Unit Under Test to 3000 MHz at −20 dBm with all modulation off.
2. Set the reference unit to 3000.020 MHz at 0 dBm.
3. Set the spectrum analyzer controls for a start frequency of 20 kHz, frequency span per division 50 Hz, and resolution bandwidth 3 Hz.
4. Connect the equipment as shown in Figure 4-6.
5. Adjust the spectrum analyzer to set the 20 kHz signal to the top graticule line on the display. Verify that the line related harmonics of the Unit Under Test are below the values shown in the table. Record the highest spurious level on each offset band.

2.0—6.2 GHz	f_o <300 Hz	50 dB down _____
	300 Hz ≤ f_o ≤ 1 kHz	60 dB down _____

PERFORMANCE TESTS

4-19. POWER LINE RELATED SPURIOUS (CW AND AM MODES) (Cont'd)

6. Change the spectrum analyzer's frequency span per division to 500 Hz. Measure and record the spurious signal levels.

   2.0—6.2 GHz f_o >1 kHz 65 dB down _____

7. Tune the Unit Under Test and reference unit to 7000 and 7000.020 respectively. Change the spectrum analyzer's frequency span per division to 50 Hz. Measure and record the spurious signal levels.

   6.2—12.4 GHz f_o <300 Hz 44 dB down_____
   300 Hz ≤ f_o ≤ 1 kHz 54 dB down_____

8. Repeat step 6.

   6.2—12.4 GHz f_o > 1 kHz 59 dB down _____

9. Repeat step 7 at 16 000 and 16 000.020 MHz respectively.

   12.4—18.0 GHz f_o <300 Hz 40 dB down_____
   300 Hz ≤ f_o ≤ 1 kHz 50 dB down_____

10. Repeat step 6.

    12.4—18.0 GHz f_o >1 kHz 55 dB down_____

11. If the power supply related spurious are not within tolerance, refer to Section VIII, Service Sheet 12-A3 for troubleshooting information.

4-20. SINGLE-SIDEBAND PHASE NOISE RATIO

SPECIFICATION:

Frequency Range (GHz)	Single Sideband Phase Noise Ratio (in 1 Hz Bandwidth and CW Mode) at Specified Offset Frequency				
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz
2.0—6.2	−58 dBc	−70 dBc	−78 dBc	−86 dBc	−110 dBc
6.2—12.4	−52 dBc	−64 dBc	−72 dBc	−80 dBc	−104 dBc
12.4—18.0	−48 dBc	−60 dBc	−68 dBc	−76 dBc	−100 dBc

DESCRIPTION: The RF outputs of two synthesizers are mixed together to obtain a 40 kHz or 200 kHz IF signal. The noise sidebands are observed on a spectrum analyzer. Correction factors are applied to compensate for the use of bandwidths wider than 1 Hz and for using the spectrum analyzer.

PERFORMANCE TESTS

4-20. SINGLE-SIDEBAND PHASE NOISE RATIO (Cont'd)

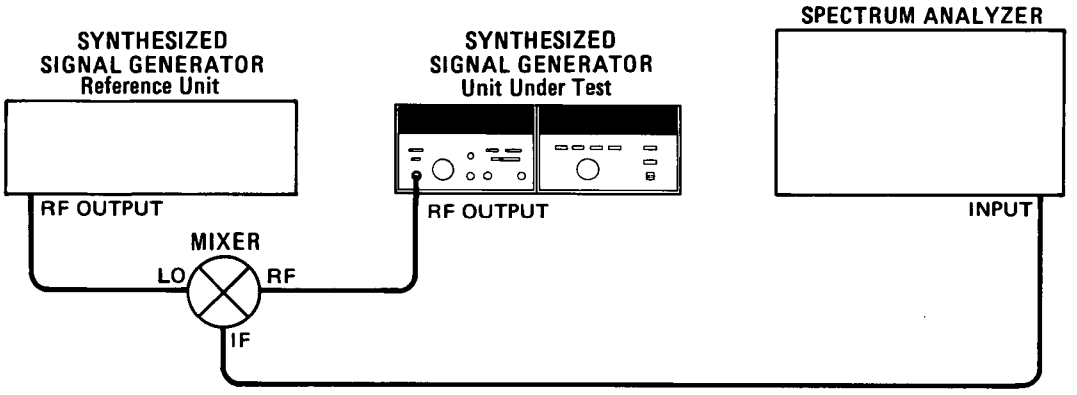


Figure 4-7. Single-Sideband Phase Noise Ratio Test Setup

EQUIPMENT:

Synthesized Signal Generator	HP 8672A
Spectrum Analyzer (5 Hz—50 kHz)	HP 3580A
Spectrum Analyzer (20 Hz—300 kHz)	HP 8556A/8552B/141T
Mixer	RHG DM1-18

NOTE

The signal-to-phase noise ratio as measured with the spectrum analyzer is reduced by the 2.4 dB noise correction factor and by a 0.8 dB noise bandwidth correction factor. These corrections are necessary due to the spectrum analyzer characteristics.

PROCEDURE:

1. Set the 5 Hz—50 kHz spectrum analyzer's start frequency to 40 kHz, bandwidth 1 Hz, frequency span per division 5 Hz.
2. Connect the equipment as shown in Figure 4-7.
3. Set the Unit Under Test to 6100 MHz at −20 dBm.
4. Set the reference unit to 6100.040 MHz at +3 dBm.
5. Set the spectrum analyzer controls so the peak of the 40 kHz signal is at the top graticule line.
6. Observe the noise level 10 Hz from the carrier. It should be greater than 58 dB below the carrier. Record the measured level.

   54.8 dB down _____
7. Change the center frequency of the Unit Under Test and the reference unit to 12 200 MHz and 12 200.040 MHz respectively.
8. Observe the noise level 10 Hz from the carrier. It should be greater than 52 dB below the carrier. Record the measured level.

   48.8 dB down _____
9. Change the center frequencies to 18 000 MHz and 18 000.040 MHz.

PERFORMANCE TESTS

4-20. SINGLE-SIDEBAND PHASE NOISE RATIO (Cont'd)

10. Observe the noise level 10 Hz away from the carrier. It should be greater than 48 dB below the carrier.

    44.8 dB down _____

11. Set the spectrum analyzer controls for a bandwidth of 3 Hz and frequency span per division of 20 Hz. (The use of a 3 Hz bandwidth requires a 4.77 dB correction in the measured noise level, that is, the actual noise level in a 1 Hz bandwidth is 4.77 dB lower than the noise measured in a 3 Hz bandwidth.)

12. Repeat steps 3 through 10 except observe the noise 100 Hz from the carrier. Record the measured levels. (The specification limits include the correction factors.)

6100 MHz	62.0 dB down _____
12 200 MHz	56.0 dB down _____
18 000 MHz	52.0 dB down _____

13. For the remainder of the procedure, use the 20 Hz—300 kHz spectrum analyzer. Set the analyzer's bandwidth to 30 Hz and frequency span per division to 200 Hz. The 30 Hz bandwidth requires a 14.77 dB correction.

14. Set the frequency of the Unit Under Test to 6100 MHz; change the reference oscillator frequency to 6100.200 MHz.

15. Tune the spectrum analyzer to place the 200 kHz IF signal at the left edge of the display. Set the spectrum analyzer controls to place the peak of the 200 kHz signal at the top graticule line. Increase the log reference level control to move the peak of the carrier 20 dB above the top graticule line.

16. Observe the noise level 1 kHz from the carrier. The corrected level should be greater than 78 dB down. Record the measured level.

    60.0 dB down _____

17. Change the Unit Under Test and reference unit frequencies to 12 200 MHz and 12 200.200 MHz respectively. The corrected noise level 1 kHz from the carrier should be greater than 72 dB down. Record the measured level.

    54.0 dB down _____

18. Change the center frequencies to 18 000 MHz and 18 000.200 MHz. The corrected noise level 1 kHz from the carrier should be greater than 68 dB down. Record the measured level.

    50.0 dB down _____

19. Set the spectrum analyzer controls for a bandwidth of 300 Hz and a frequency span per division of 2 kHz. The correction for the 300 kHz bandwidth is 24.77 dB.

20. Repeat steps 14 through 18 except observe the noise 10 kHz from the carrier and add the 24.77 dB correction factor. Record the measured levels.

6100 MHz	58.0 dB down _____
12 200 MHz	52.0 dB down _____
18 000 MHz	48.0 dB down _____

PERFORMANCE TESTS

4-20. SINGLE-SIDEBAND PHASE NOISE RATIO (Cont'd)

21. Set the spectrum analyzer controls for a bandwidth of 3 kHz and frequency span per division of 20 kHz. The correction factor is 34.77 dB.

22. Repeat steps 14 through 18 except observe the noise 100 kHz from the carrier and add the 34.77 dB correction factor. Record the measured levels.

6100 MHz	72.0 dB down _____
12 200 MHz	66.0 dB down _____
18 000 MHz	62.0 dB down _____

23. If the Single-Sideband Phase Noise Ratio is out of tolerance, perform the following adjustments in Section V: YTO Driver, VCXO, M/N Loop, 20/30 Loop VCO, YTO Sampler, YTO Phase Detector, YTO Offset and FM Overmodulation and FM Driver.

4-21. FM FREQUENCY RESPONSE

SPECIFICATION: (Relative to 100 kHz)
For 30 and 100 kHz/V ranges, ±2.0 dB from 100 Hz to 3 MHz
For 300 kHz and 1,3 and 10 MHz/V ranges, ±2.0 dB from 3 kHz to 3 MHz.

DESCRIPTION: The test oscillator is tuned to 100 kHz and the output level is adjusted to obtain the first carrier (Bessel) null (β = 2.404). The output level and the 100 kHz rate are the references for later calculations. At other modulation rates, the output level is set and measured for the first carrier null. The measured voltage and the rate are then compared to the established reference to determine frequency response.

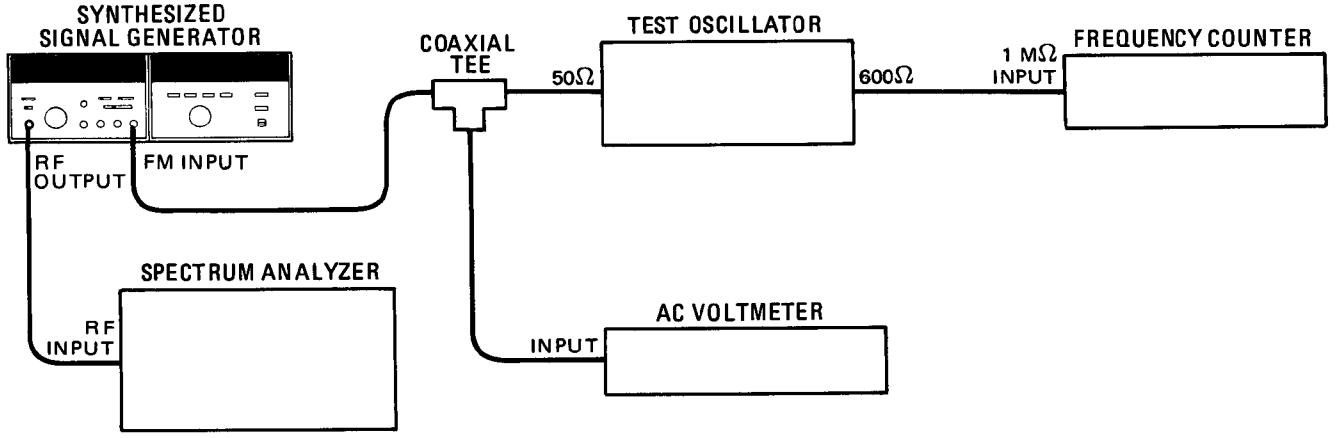


Figure 4-8. FM Frequency Response Test Setup

EQUIPMENT:

AC Voltmeter	HP 400E
Frequency Counter	HP 5340A
Spectrum Analyzer	HP 8565A
Test Oscillator	HP 651B

PERFORMANCE TESTS

4-21. FM FREQUENCY RESPONSE (Cont'd)

PROCEDURE:

1. Connect the equipment as shown in Figure 4-8.

2. Tune the Synthesizer's controls to 3 GHz at 0 dBm. Adjust the spectrum analyzer's controls to display the RF signal. Set the scan width to 100 kHz per division initially. Set the other controls as needed for a calibrated display. (It will be necessary to change the scan width for later measurements).

3. Set the FM deviation switch to the 10 MHz range and tune the test oscillator as accurately as possible to 100 kHz.

4. Adjust the test oscillator output voltage to obtain the first carrier (bessel) null (β = 2.404). Record the voltage indicated on the AC voltmeter in the table. (The voltage should be approximately 0.017 Vrms).

5. Tune the test oscillator to 3 kHz (f_x) and adjust the output voltage (V_x) to obtain the first carrier null. Record the measured frequency and voltage in the table.

6. Repeat step 5 for each of the remaining frequencies listed in the following table.

Frequency (in kHz)	Measured Frequency (f_x; in kHz)	Measured Voltage V_x (mVrms)	Calculated Response (in dB)
3	_____	_____	_____
30	_____	_____	_____
100	100.0	_____	0
300	_____	_____	_____
1000	_____	_____	_____
3000	_____	_____	_____

7. Use the following equation to calculate the flatness of the FM circuits:

$$dB = 20 \log \frac{V_x}{V_{100\ kHz}} - 20 \log \frac{f_x}{100\ kHz}$$

where dB = the calculated frequency response

V_x = the voltage measured at f_x

$V_{100\ kHz}$ = the reference voltage measured at 100 kHz

f_x = the measured frequency.

8. If the FM frequency response is not within the requried tolerance, perform the FM Driver Adjustment and the FM Adjustment in Section V.

PERFORMANCE TESTS

4-22. FM HARMONIC AND NON-HARMONIC DISTORTION

SPECIFICATION: Less than 12% for rates less than 3 kHz decreasing linearly with frequency to 5% at 20 kHz. Less than 5% for 20 to 100 kHz rates.

NOTE

For certain FM Modulating frequencies, spurious FM signals (non-harmonic distortion) may occur. After demodulation in an external FM discriminator, the contribution to distortion of those spuriours FM signals is typically less than 0.6%.

DESCRIPTION: The frequency modulated RF output of the Unit Under Test is mixed with an unmodulated RF signal from the local oscillator offset by 100 MHz. The modulation analyzer is used as an FM detector. The output of the modulation analyzer is measured for distortion by the audio analyzer.

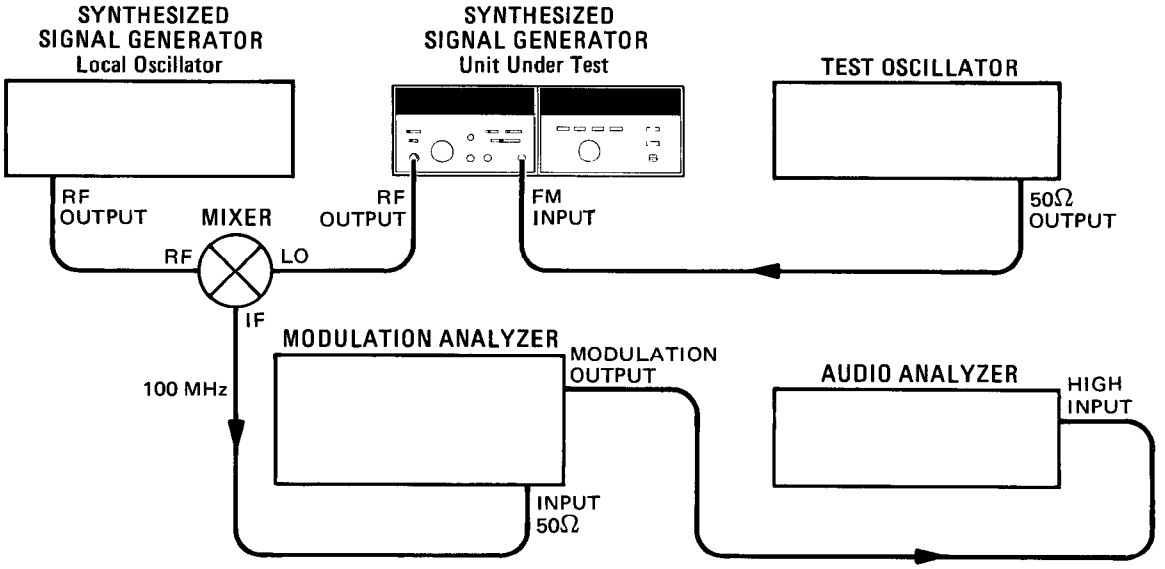


Figure 4-9. FM Distortion Test Setup

EQUIPMENT:

Synthesized Signal Generator	8672A
Modulation Analyzer	8901A
Audio Analyzer	8903A
Test Oscillator	651B
Double Balanced Mixer	RHG DM 1-18

PROCEDURE: 1. Connect the equipment as shown in Figure 4-9.

PERFORMANCE TESTS

4-22. FM HARMONIC AND NON-HARMONIC DISTORTION (Cont'd)

2. Set the controls of the Unit Under Test and the local oscillator as follows:

METER MODE switch	LEVEL
RF switch	ON
OUTPUT LEVEL RANGE switch	+10 dBm
OUTPUT LEVEL VERNIER control	fully clockwise
ALC mode switch	INT
AM FUNCTION switch	OFF
FM DEVIATION switch	OFF

3. Set the local oscillator to 3100 MHz.

4. Set the Unit Under Test to 3000 MHz, the METER mode switch to FM, and the FM DEVIATION MHz switch to .03.

5. Set the modulation analyzer by pressing the AUTOMATIC OPERATION and FM keys.

6. Set the audio analyzer by pressing the AUTOMATIC OPERATION and DISTN keys. Make sure the 80 kHz LOW PASS filter is not selected. The audio analyzer defaults on turn-on with this filter selected.

7. Set the test oscillator for 1 kHz output and adjust the output level to obtain 5 kHz peak deviation indication on the modulation analyzer or the front panel meter of the Unit Under Test.

8. Read the distortion displayed on the audio analyzer. The distortion should be less than 12%.

_____ <12%

9. Change the test oscillator to 20 kHz. The distortion should be less than or equal to 5%.

_____ ≤5%

10. Slowly change the test oscillator's frequency from 20 kHz to 100 kHz, stopping occasionally to determine that the distortion is less than 5% over the range.

11. If the FM distortion is not within the required tolerance, perform the FM Driver Adjustments in Section V. Then, if necessary, refer to Service Sheet 8-A1 or 10-A3 for troubleshooting information.

PERFORMANCE TESTS

4-23. RESIDUAL FM IN FM AND CW MODES

SPECIFICATION: Noise and power line related
In CW and 30 kHz/V thru 100 kHz/V ranges
16 Hz-rms in 300 Hz—3 kHz post detection bandwidth
80 Hz-rms in 50 Hz—15 kHz post detection bandwidth
In 300 kHz/V, 1, 3 and 10 MHz/V ranges
20 Hz-rms in 300 Hz—3 kHz post detection bandwidth
100 Hz-rms in 50 Hz—15 kHz post detection bandwidth
Residual FM doubles in the 6.2—12.4 GHz range; triples in the 12.4—18.0 GHz range.

DESCRIPTION: The RF output of the Unit Under Test is mixed with the RF output of the local oscillator. The IF signal produced is demodulated and filtered in the modulation analyzer to produce an output proportional to the residual FM. The output is measured using a digital voltmeter to increase the resolution.

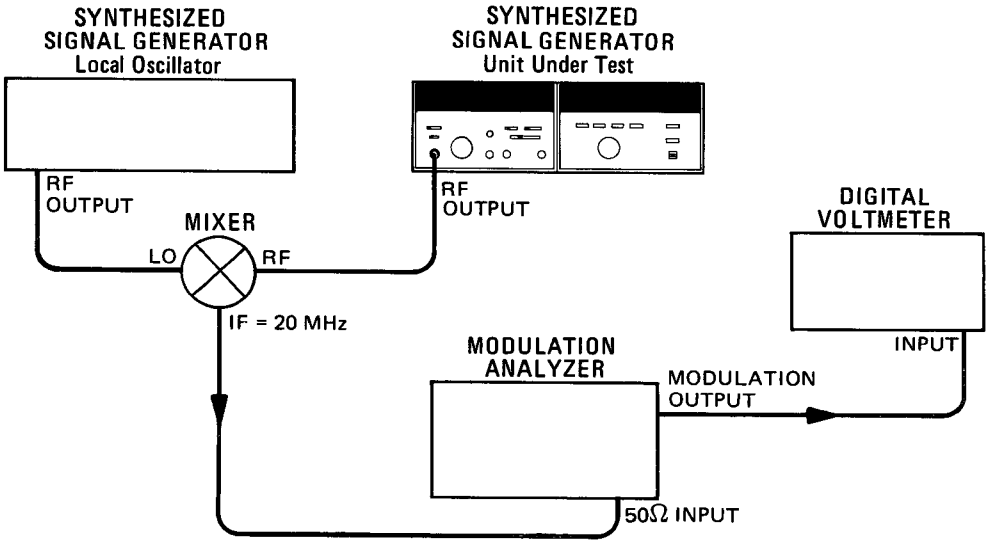


Figure 4-10. Residual FM in FM and CW Modes Test Setup

EQUIPMENT:

Synthesized Signal Generator	HP 8672A
Double Balanced Mixer	RHG DM 1-18
Modulation Analyzer	HP 8901A
Digital Voltmeter	HP 3455A

PROCEDURE: 1. Connect the equipment as shown in Figure 4-10.

PERFORMANCE TESTS

4-23. RESIDUAL FM IN FM AND CW MODES (Cont'd)

2. Set the controls of the Unit Under Test and the local oscillator as follows:

METER MODE switch	LEVEL
RF switch	ON
OUTPUT LEVEL RANGE switch	+10 dBm
OUTPUT LEVEL VERNIER control	fully clockwise
ALC mode switch	INT
AM FUNCTION switch	OFF
FM DEVIATION switch	OFF

3. Set the Unit Under Test to 3000 MHz and the local oscillator to 3020 MHz.
4. Check both units to ensure that neither one has signals connected to the AM or FM INPUT jacks.
5. Set digital voltmeter to AC.
6. On the modulation analyzer press the following keys: FM, AVG, 300 kHz HI-PASS FILTER and 3 kHz LOW PASS FILTER. The average deviation can be read from either the modulation analyzer's display or the digital voltmeter's display which provides increased resolution. After allowing the reading to settle, read the residual FM for the entire setup.
7. Because two independent instruments are being measured, divide the reading by two to obtain probable residual FM for a single instrument. This assumes the two instruments are of equal performance. The result should be less than 16 Hz in a 300 Hz to 3 kHz post detection bandwidth.

   2.000—6.199 GHz 16 Hz-rms_____
8. Set the local oscillator to 12 220 MHz and the Unit Under Test to 12 200 MHz. Measure the residual FM as in steps 6 and 7. The results should be less than 32 Hz.

   6.200—12.399 GHz 32 Hz-rms _____
9. Set the local oscillator to 14 000 MHz and the Unit Under Test to 14 020 MHz. Measure the residual FM as in steps 6 and 7. The results should be less than 48 Hz.

   12.400—18.000 GHz 48 Hz-rms _____
10. Because two independent instruments are being measured, divide the reading by two to obtain probable residual FM for a single instrument. This assumes the two instruments are of equal performance. The result should be less than 80 Hz in a 50 Hz to 15 kHz post detection bandwidth.

    2.000—6.199 GHz 80 Hz-rms _____
11. Set the local oscillator to 12 220 MHz and the Unit Under Test to 12 200 MHz. Measure the residual FM as in steps 6 and 10. The results should be less than 160 Hz.

    6.200—12.399 GHz 160 Hz-rms _____
12. Set the local oscillator to 14 000 MHz and the Unit Under Test to 14 020 MHz. Measure the residual FM as in steps 6 and 10. The results should be less than 240 Hz.

    13.400—18.000 GHz 240 Hz-rms _____
13. If the residual FM is not within the required tolerance, perform the Single Sideband Phase Noise Performance Test.

PERFORMANCE TESTS

4-24. RF OUTPUT LEVEL AND ACCURACY

SPECIFICATION: Output Level: +3 to −120 dBm into 50 ohms, +15 to +35°C.
Additional power available on +10 dBm range (overrange), but for power settings above +3 dBm, spurious oscillations may degrade performance.

For Option 001, 034 or 038 instruments, specified RF output power is +5 to −10 dBm; for Option 004 instruments, maximum is +2.0 dBm; for Option 005 instruments +4.0 to −10 dBm.

For Options 004 and 005 instruments, total indicated meter accuracy is degraded by an additional ±0.25 dB.

Total Indicated Meter Accuracy: Applies for Internal Leveling only.

Frequency Range	Indicated Meter Accuracy (at OUTPUT LEVEL RANGE switch settings)*			
	0 dBm	−10 dBm	−20 dBm	−30 dBm and Below
2.0—6.2 GHz	±1.75 dB	±2.25 dB	±2.45 dB	±1.75 dB ± 0.30 dB per 10 dB step below 0 dBm range
6.2—12.4 GHz	±2.00 dB	±2.50 dB	±2.70 dB	±2.00 dB ± 0.30 dB per 10 dB step below 0 dBm range
12.4—18.0 GHz	±2.25 dB	±2.85 dB	±3.05 dB	±2.25 dB ± 0.40 dB per 10 dB step below 0 dBm range

*Specification includes allowances for meter accuracy (typically ±0.5 dB), detector linearity, temperature, flatness, attenuator accuracy, and measurement uncertainty. All but the attenuator accuracy and measurement uncertainty can be calibrated out with a power meter at fixed vernier settings.

DESCRIPTION: A power meter is used to measure the Synthesizer's RF output level down to the −60 dBm range. All ranges below −60 dBm are checked by measuring the accuracy relative to the level measured at −60 dBm.

PERFORMANCE TESTS

4-24. RF OUTPUT LEVEL AND ACCURACY (Cont'd)

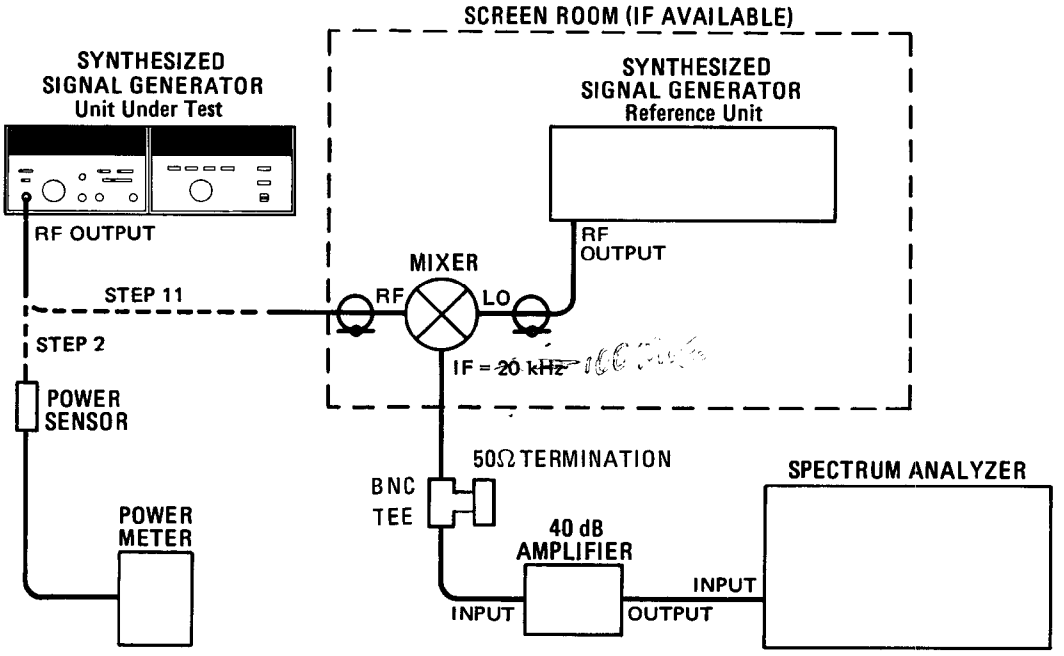


Figure 4-11. RF Output Level and Accuracy Test Setup

EQUIPMENT:

Synthesized Signal Generator	HP 8672A
Power Meter/Power Sensor	HP 436A/8481A and 8484A
Mixer	RHG DM1-18
Spectrum Analyzer	HP 8556A/8552B/141T
50 Ohm Termination	HP 11593A
40 dB Amplifier	HP 8447A Option 001
Semi-Rigid Coaxial Cable	Locally Fabricated

PROCEDURE:

1. Set the controls of the Unit Under Test as follows:

PRESET (3 GHz) pushbutton	press for 3000 MHz
METER MODE switch	LEVEL
RF switch	ON
ALC	INT
Output LEVEL RANGE switch	0 dBm
Output LEVEL VERNIER control (adjust for meter reading)	0 dB
AM	OFF
FM	OFF

DO NOT CHANGE the VERNIER control setting for the remainder of this test.

2. Connect the power sensor (HP 8481A) to the power meter and press the power meter's zeroing pushbutton. Calibrate the power meter/sensor.

PERFORMANCE TESTS

4-24. RF OUTPUT LEVEL AND ACCURACY (Cont'd)

3. Connect the power sensor to the RF OUTPUT connector of the Unit Under Test.

4. In the following steps, set the power meter's calibration factor switch as required. As indicated in the table and the following steps, measure and record the power level of the Unit Under Test.

5. Set the OUTPUT RANGE switch of the Unit Under Test to −10 and −20 dBm. Record the measured levels.

6. Set the OUTPUT RANGE switch to 0 dBm and repeat steps 4 and 5 at 8000 and 18 000 MHz.

7. Replace the power sensor with the more sensitive model (HP 8484A).

8. Rezero and recalibrate the power meter system.

9. Connect the power sensor to the RF OUTPUT connectors of the Unit Under Test.

10. Measure and record the output levels at OUTPUT LEVEL RANGE switch settings of −30 to −60 dBm at frequencies of 3000, 8000, and 18 000 MHz. Be sure to reset the calibration factor switch as required.

NOTE

This test may be performed at any frequency from 2 to 18 GHz.

Output Level Range (dBm)	Measured Output Level (dBm) at Frequency (f_o)								
	2.0 GHz ≤ f_o < 6.2 GHz			6.2 GHz ≤ f_o < 12.4 GHz			12.4 GHz ≤ f_o ≤ 18.0 GHz		
	Min	Measured	Max	Min	Measured	Max	Min	Measured	Max
0	−1.75	_____	+1.75	−2.00	_____	+2.00	−2.25	_____	+2.25
−10	−12.25	_____	−7.75	−12.50	_____	−7.50	−12.85	_____	−7.15
−20	−22.45	_____	−17.55	−22.70	_____	−17.30	−23.05	_____	−16.95
−30	−32.65	_____	−27.35	−32.90	_____	−27.10	−33.45	_____	−26.55
−40	−42.95	_____	−37.05	−43.20	_____	−36.80	−43.85	_____	−36.15
−50	−53.25	_____	−46.75	−53.50	_____	−46.50	−54.25	_____	−45.75
−60	−63.55	_____	−56.45	−63.80	_____	−56.20	−64.65	_____	−55.35

11. Disconnect the power meter. Connect the other equipment shown in Figure 4-11. If necessary, paint the non-movable seams of the Type-N to Sealectro connectors and semi-rigid cables with a conductive coating.[1]

[1] From the Sel. Rex Company, Conductive Coating, part number LO2-1068, HP part number 6010-0006.

PERFORMANCE TESTS

4-24. RF OUTPUT LEVEL AND ACCURACY (Cont'd)

NOTES

The remainder of this test does not make absolute power measurements. The test does give reasonable assurance that the output level accuracy in the lower ranges meets the performance standards.

The semi-rigid cables used in this test may easily be twisted or bent. Stressing these cables in any way may affect the measurement capability of the system.

12. Press the PRESET pushbutton of the Unit Under Test.

13. Tune the reference unit to 3000.100 MHz at +7 dBm or maximum leveled power available.

14. Adjust the spectrum analyzer's vertical sensitivity controls so the amplitude of the IF signal (100 kHz) is set to the center horizontal graticule as a reference level (2 dB per division sensitivity). Note the vertical sensitivity control setting. Set the resolution bandwidth to 300 Hz or less.

15. Decrease the OUTPUT LEVEL RANGE switch setting of the Unit Under Test in 10 dB steps down to the lowest range. For each range, readjust the spectrum analyzer's vertical sensitivity controls to bring the displayed level back to the reference graticule. Record the difference from the reference level (step 14).

16. Tune the Unit Under Test to 8000 MHz; reference unit to 8000.100 MHz. Repeat steps 14 and 15.

17. Tune the Unit Under Test to 18 000 MHz; reference unit to 18 000.100 MHz. Repeat steps 14 and 15.

Output Level Range (dBm)	Output Level (dB down from level at −60 dBm range) at Frequency (f_o)								
	2.0 GHz ≤ f_o < 6.2 GHz			6.2 GHz ≤ f_o < 12.4 GHz			12.4 GHz ≤ f_o ≤ 18.0 GHz		
	Min	Measured	Max	Min	Measured	Max	Min	Measured	Max
−70	9.7	_____	10.3	9.7	_____	10.3	9.6	_____	10.4
−80	19.4	_____	20.6	19.4	_____	20.6	19.2	_____	20.8
−90	29.1	_____	30.9	29.1	_____	30.9	28.8	_____	31.2
−100	38.8	_____	41.2	38.8	_____	41.2	38.4	_____	41.6
−110	48.5	_____	51.5	48.5	_____	51.5	48.0	_____	52.0

18. If the RF output level and accuracy are not within tolerance, perform the ALC Adjustment procedure in Section V.

PERFORMANCE TESTS

4-25. INCIDENTAL PHASE AND FREQUENCY MODULATION

SPECIFICATION: At rates ≤10 kHz and 30% AM depth, incidental FM shall be:
less than 7 kHz (0.7 radians) from 2.0 to 6.2 GHz
less than 18 kHz (1.8 radians) from 6.2 to 12.4 GHz
less than 12 kHz (1.2 radians) from 12.4 to 18 GHz.

DESCRIPTION: The RF outputs of two Synthesizers are mixed and the IF is monitored on an oscilloscope and spectrum analyzer. The Unit Under Test is amplitude modulated to establish a reference level on the spectrum analyzer at a synchronized phase difference of 90° (minimum measurement sensitivity to incidental phase and frequency modulation). The synthesizers' outputs are synchronized to a phase difference of 0° (maximum measurement sensitivity to incidental phase and frequency modulation). The measurement level is compared to the AM reference level.

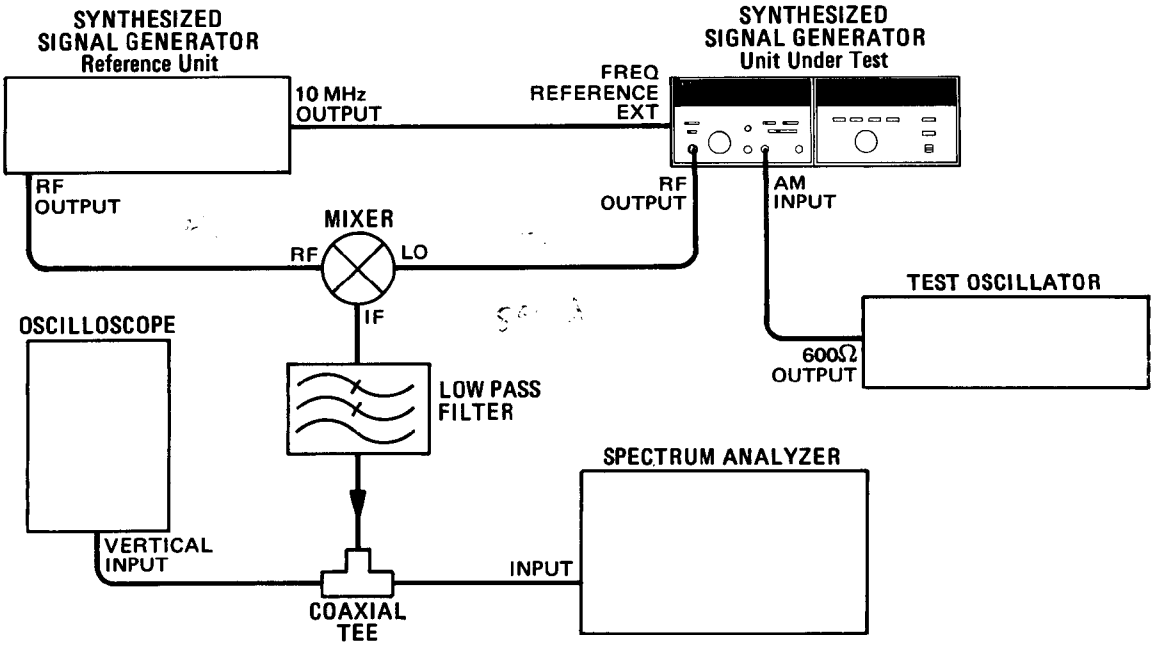


Figure 4-12. Incidental Phase and Frequency Modulation Test Setup

EQUIPMENT:

Synthesized Signal Generator	HP 8672A
Mixer	RHG DM1-18
Test Oscillator	HP 651B
Oscilloscope	HP 180C/1801A/1821A
Spectrum Analyzer	HP 3580A
Low Pass Filter (15 kHz)	(See Figure 1-2)

PROCEDURE:

1. Set the controls of the Unit Under Test as follows:

METER MODE switch	LEVEL
RF switch	ON

PERFORMANCE TESTS

4-25. INCIDENTAL PHASE AND FREQUENCY MODULATION (Cont'd)

OUTPUT LEVEL RANGE switch . . . . —20 dBm
OUTPUT LEVEL VERNIER control
(adjusted for meter reading) . . . . . +3 dB
ALC mode switch . . . . . INT
AM function switch . . . . . OFF
FM function switch . . . . . OFF

2. Press the PRESET (3 GHz) pushbutton.

3. Set the reference unit controls for 3000.008 MHz at +3 dBm.

4. Connect the equipment as shown in Figure 4-12.

5. Adjust the oscilloscope's controls to obtain an 8 vertical division display of the 8 kHz IF signal.

6. Tune the reference unit to 3000.001 MHz.

7. Tune the reference unit to 3000.000 MHz to obtain a dc level within ±1/10 division of top graticule line.

8. Repeat steps 5 and 6 as often as necessary to end up within ±1/10 division. This may be quite difficult since the display is moving at a 1 kHz rate.

9. Set test oscillator's controls to 10 kHz at 0.34 Vrms.

10. Set the Unit Under Test AM function switch to 100%. Adjust the test oscillator output to obtain a display of 3.87 division peak-to-peak (48.5% AM).

NOTE

Do not adjust the test oscillator's controls for the duration of this test.

11. Adjust the spectrum analyzer controls for a convenient 0 dB reference level at 10 kHz.
12. Set Unit Under Test AM switch to OFF.
13. Tune the reference unit to 3000.001 MHz.
14. Retune the reference unit to 3000.000 MHz to obtain a dc level within ±1/10 division of the center graticule line.
15. Repeat steps 13 and 14 until the required tolerance is achieved.
16. Set the Unit Under Test AM switch to ON.
17. Measure and record the level indicated by the spectrum analyzer. The signal should be ⩾ 2.35 dB below the reference level.

2.35 dB down _____

18. If the incidental phase and frequency modulation is not within tolerance, refer to Service Sheet 4 in Section VIII for troubleshooting information.

PERFORMANCE TESTS

4-26. FREQUENCY SWITCHING TIME

SPECIFICATION: (CW and AM modes)
Less than 15 ms to be within 1 kHz for frequencies 2—6.2 GHz; within 2 kHz from 6.2—12.4 GHz; within 3 kHz from 12.4—18 GHz.

DESCRIPTION: The measurement system is connected so the oscilloscope is triggered at the execute frequency change command. The mixer output is viewed on the oscilloscope display. Switching is completed when the displayed frequency settles to the minimum resolution (1, 2, or 3 kHz), the difference between the Synthesizers' outputs.

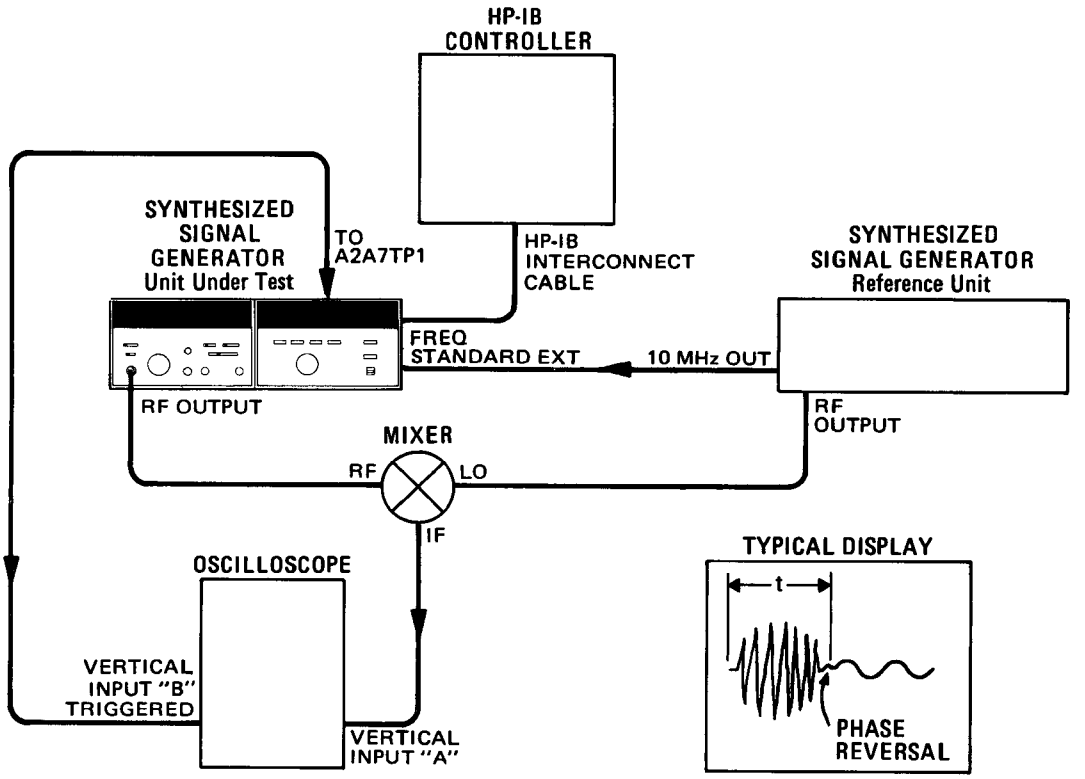


Figure 4-13. Frequency Switching Time Test Setup

EQUIPMENT:

HP-IB Controller	HP 9830A or HP 9825A with HP 11712A
Synthesized Signal Generator	HP 8672A
HP-IB Interconnect Cable	HP 10833A
Mixer	RHG DM1-18
Oscilloscope	HP 180C/1801A/1821A

WARNING

This test may be performed with power supplied and protective covers removed. If the covers are removed, this test should be performed only by service-trained personnel who are aware of the hazards involved (for example, fire and electrical shock).

PERFORMANCE TESTS

4-26. FREQUENCY SWITCHING TIME (Cont'd)

NOTE

The necessity of removing the Synthesizer's covers to perform this test is eliminated if the oscilloscope's trigger input is connected to pin 6 of the HP-IB Interconnect Cable. In this case, proceed immediately to step 8.

PROCEDURE:

1. Disconnect the line (Mains) power cable from the Synthesizer's rear panel.
2. Remove the two rear panel standoffs which are in contact with the top cover.
3. Loosen the screw at the center of the top cover's rear lip. Slide the cover toward the rear. Remove the cover.
4. Remove the screw which holds the A2 Assembly's protective cover in place. The screw is located near the right rear corner of the instrument.
5. Lift and remove the cover while sliding it toward the rear of the instrument.
6. Reconnect the line (Mains) power cable to the rear panel power module.
7. Connect the oscilloscope's triggered vertical input to A2A7TP1. (This test point pulses high when the frequency execute command is accepted by the Synthesizer.
8. Connect the Synthesizer and HP-IB controller together with a HP-IB Interconnect Cable.
9. Set the oscilloscope controls to alternate B display, sweep time per division 2 ms, sweep mode normal/internal, and positive slope.

NOTE

The following programs are for the HP 9830A Calculator. For use with any other HP-IB controller, the program may need to be modified.

10. Load and run the following HP-IB controller program. This program is used to set the oscilloscope for reliable triggering on the pulse at A2A7TP1.

```
10 OUTPUT (13,20)1280,768;
20 FORMAT 2B
30 CMD "?U3","Z1Z1Z1Z1Z1Z1Z1Z1Z1"
40 GOTO 30
50 END
```

Frequency Execute

11. Connect the remaining equipment as shown in Figure 4-13. Set front panel EXT ALC CAL adjustment fully CW.
12. Set the frequency of the reference unit to 2100.001 MHz at +5 dBm.

PERFORMANCE TESTS

4-26. FREQUENCY SWITCHING TIME (Cont'd)

13. Load and run the following program. The Synthesizer's initial conditions are set. Then this program will continue switching between output frequencies of 18 GHz and 2.1 GHz until the stop key is pressed.

```
10 OUTPUT (13,20)1280,768;
20 FORMAT 2B
30 CMD "?U3","K00075"
40 CMD "","P1800000002I"
50 WAIT 30
60 CMD "","A2100000021"
70 WAIT 10
80 GOTO 40
90 END
```

0 dBm range +3 dB meter reading, AM OFF, FM OFF, RF OFF, and EXT XTAL.

18 000.000 MHz, frequency execute.

2100.000 MHz, frequency execute

WAIT period depends on the type of oscilloscope being used. Some oscilloscopes require more time.

NOTE

Lines 50 and 70 are included to stabilize the oscilloscope's display.

14. Measure the switching time by observing the signal on the oscilloscope display. (The Frequency Execute program code triggers the oscilloscope's horizontal sweep. Therefore, the timing begins at the display's left graticule. The timing ends at the last phase reversal as the IF signal settles into a steady frequency. Refer to Figure 4-13. This should occur in less than 15 ms. Record the switching time.

_____ 15 ms

15. Interchange lines 40 and 60 of the program.

16. Tune the reference unit to 17 999.997 MHz.

17. Rerun the program. Record the switching time to the last phase reversal.

_____ 15 ms

18. If the frequency switching time is not within tolerance, refer to Section VIII Service Sheet 1 for troubleshooting information.

4-27. OUTPUT LEVEL SWITCHING TIME

SPECIFICATION: <20 ms (typically <10 ms for any change on the same output level range). Applies for internal leveling only.

DESCRIPTION: The measuring system is set up to trigger the oscilloscope at the instant the change output level command is given. The RF output is detected and coupled to the oscilloscope's vertical input. The time to complete switching (which includes settling time) is viewed on the oscilloscope display.

PERFORMANCE TESTS

4-27. OUTPUT LEVEL SWITCHING TIME (Cont'd)

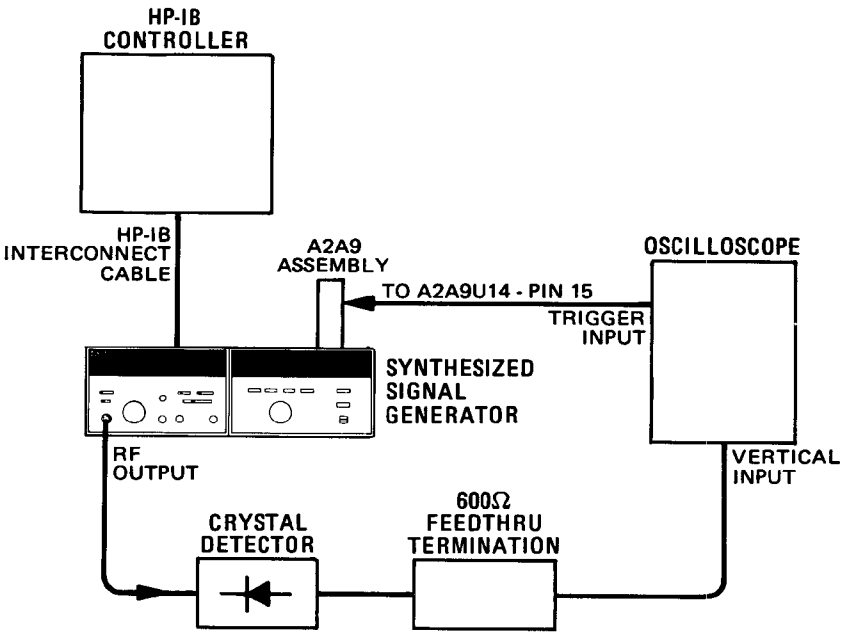


Figure 4-14. Output Level Switching Time Test Setup

EQUIPMENT:

Oscilloscope	HP 181A/1801A/1821A
HP-IB Controller	HP 9830A or HP 9825A with HP 11712A
HP-IB Interconnect Cable	HP 10833A
Crystal Detector	HP 8470B Opt 012
600Ω Feedthru Termination	HP 11095A

WARNING

This test may be performed with power supplied and protective covers removed. If the covers are removed, this test should be performed only by service-trained personnel who are aware of the hazards involved (for example, fire and electrical shock).

NOTE

The necessity of removing the Synthesizer's covers to perform this test is eliminated if the oscilloscope's trigger input is connected to pin 6 of the HP-IB cable. In this case, proceed immediately to step 8.

PROCEDURE:

1. Disconnect the line (Mains) power cable from the Synthesizer's rear panel.
2. Remove the two rear panel standoffs which are in contact with the top cover.
3. Loosen the screw at the center of the top cover's rear lip. Slide the cover toward the rear. Remove the cover.

PERFORMANCE TESTS

4-27. OUTPUT LEVEL SWITCHING TIME (Cont'd)

4. Remove the screw which holds the A2 Assembly's protective cover in place. The screw is located near the right rear corner of the instrument.

5. Lift the cover while sliding it toward the rear of the instrument.

6. Remove the A2A9 Remote Interface Assembly. Reinstall it on a 30 pin extender board.

7. Reconnect the line (Mains) power cable to the rear panel power module. Allow the Synthesizer to warm up until the OVEN status light goes out.

8. Connect the rest of the equipment as shown in Figure 4-14.

9. Connect the oscilloscope's triggered input to A2A9 U14-pin 15, or pin 6 of the HP-IB Interconnect Cable. Set the oscilloscope to trigger on the negative going edge of the DAV (Data Valid) pulse.

10. Set the oscilloscope to 5 ms per division, persistance to maximum and input sensitivity as required.

11. Load and run the following HP-IB controller program.

NOTE

The following program is for use in the HP 9830A Calculator. For use with any other HP-IB controller, the program must be modified.

```
10 REM THIS PROGRAM IS USED FOR OUTPUT LEVEL SWITCHING TIME TEST
20 OUTPUT (13,30)1280,768;
30 FORMAT 2B
40 CMD "?U3","A3000000Z1L3075"
50 STOP
60 FOR F=1 TO 50
70 CMD "","K0","","K"
80 WAIT 200
90 OUTPUT (13,30)59;
100 WAIT 100
110 NEXT F
120 END
```

3000.000 MHz, frequency execute, 0 dB meter reading, AM OFF, FM OFF, RF ON and EXT XTAL.

F is a counter; repeats sub-routine (lines 60 through 110) 50 times.

Attenuation 0 dBm range, ready to reset attenuation.

Resets attenuation to −110 dBm range.

NOTES

Lines 80 and 100 are included to stabilize the oscilloscope's display.

When the oscilloscope is set to trigger on the negative-going edge of the DAV pulse, the switching time from the maximum attenuation range to the 0 dBm range is displayed.

4-27. OUTPUT LEVEL SWITCHING TIME (Cont'd)

12. When the STOP command (step 40) is reached, erase the oscilloscope display and press CONTINUE EXECUTE to complete the program. The time required to switch should be less than 20 ms. Record the slowest switching time shown on the oscilloscope display.

_____20 ms

13. If the output level switching time is not within the required tolerance, refer to Section VIII Service Sheet 4 for troubleshooting information.

4-28. AM RATES

SPECIFICATION: For 3 dB bandwidth: 10 Hz to 100 kHz.

DESCRIPTION: The Synthesizer is modulated with a signal of fixed amplitude at various frequencies. A loaded crystal detector is used to demodulate the microwave signal and the amplitude of the recovered modulation is observed on an oscillosocpe.

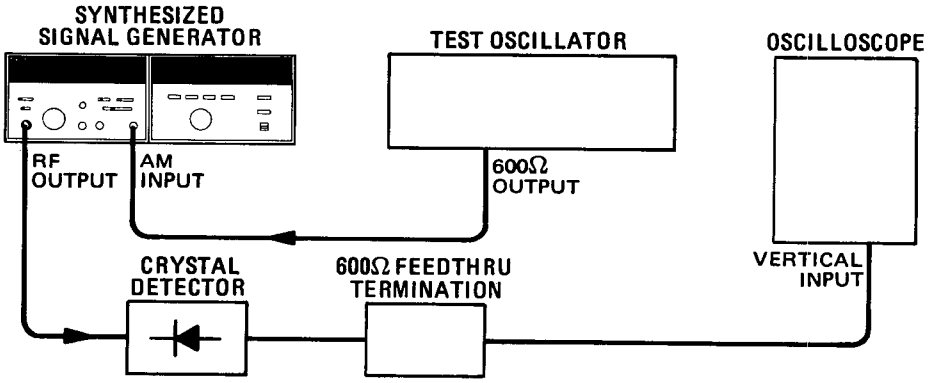


Figure 4-15. AM Rate Test Setup

EQUIPMENT:

Crystal Detector	HP 8470B Option 012
Oscilloscope	HP 180C/1801A/1821A
Test Oscillator	HP 651B
600Ω Feedthru Termination	HP 11095A

PROCEDURE:

1. Connect the equipment as shown in Figure 4-15.
2. Set the Synthesizer's AM function switch to 30%, OUTPUT LEVEL to 0 dBm, and tune to 3000 MHz.
3. Set the test oscillator output to 10 kHz and adjust the output amplitude to obtain an indicated 30% AM on the Synthesizer's front panel meter.
4. Set the oscilloscope to obtain a 5 division peak-to-peak display of the demodulated waveform. The 5 division display represents the nominal 0 dB point. A 3.5 division display is 3 dB down, and a 7 division display is 3 dB greater.

PERFORMANCE TESTS

4-28. AM RATES (Cont'd)

5. Vary the test oscillator's frequency over the range of 10 Hz to 100 kHz while observing the signal amplitude on the oscilloscope. The signal should remain greater than 3.5 divisions. Record the minimum amplitude.

Minimum amplitude 3.5 div._____

NOTE

This test may be performed at any desired output frequency.

6. If the AM bandwidth is not within the required tolerance, perform the AM Bandwidth Adjustment in Section V.

4-29. INCIDENTAL AM

SPECIFICATION: Less than 10% at rates less than or equal to 100 kHz and peak deviation less than or equal to 1 MHz.

DESCRIPTION: A reference is established by modulating the Synthesizer at 10% AM (the maximum allowable incidental AM). The detected signal is measured with a voltmeter. The Synthesizer is frequency modulated while the detected AM level is compared to the reference level.

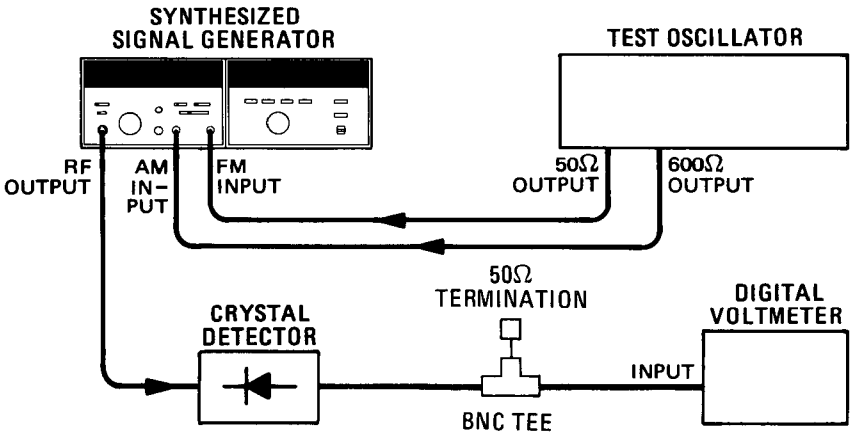


Figure 4-16. Incidental AM Test Setup

EQUIPMENT:

Crystal Detector	HP 8470B Option 012
Digital Voltmeter	HP 3455A
Test Oscillator	HP 651B
50Ω Termination	HP 11593A

PROCEDURE:

1. Connect the equipment as shown in Figure 4-16.
2. Set the Synthesizer's AM function switch to 30% and the METER MODE switch to AM.
3. Set the test oscillator to 10 kHz, and adjust the output for a 5% AM modulation reading on the Signal Generator.

PERFORMANCE TESTS

4-29. INCIDENTAL AM (Cont'd)

4. Record the detected level of AM as indicated by the digital voltmeter.

   Reference Level _____ Vrms

5. Set the Synthesizer's AM function switch to OFF; set the FM Deviation switch to 1 MHz.

6. Set the test oscillator's frequency to 100 kHz.

7. Vary the test oscillator's amplitude between 0 and 0.35 Vrms. Verify that the DVM reading is less than the level recorded in step 4. Record the maximum level.

   _____ Vrms

8. If the incidental AM is not within the required tolerance, refer to Section VIII, Service Sheet 4 for troubleshooting information.

4-30. INTERNAL TIME BASE AGING RATE

SPECIFICATION: Less than 5×10^{-10} per day after 30 day warmup. For instruments disconnected from Mains power less than 24 hours, the aging rate is $<5 \times 10^{-10}$ per day after a 24 hour warmup.

DESCRIPTION: A reference signal from the Synthesizer (10 MHz OUT) is connected to the oscilloscope's vertical input. A frequency standard (with long term stability greater than 1×10^{-10}) is connected to the trigger input. The time required for a specific phase change is measured immediately and after a period of time. The aging rate is inversely proportional to the absolute value of the difference in the measured times.

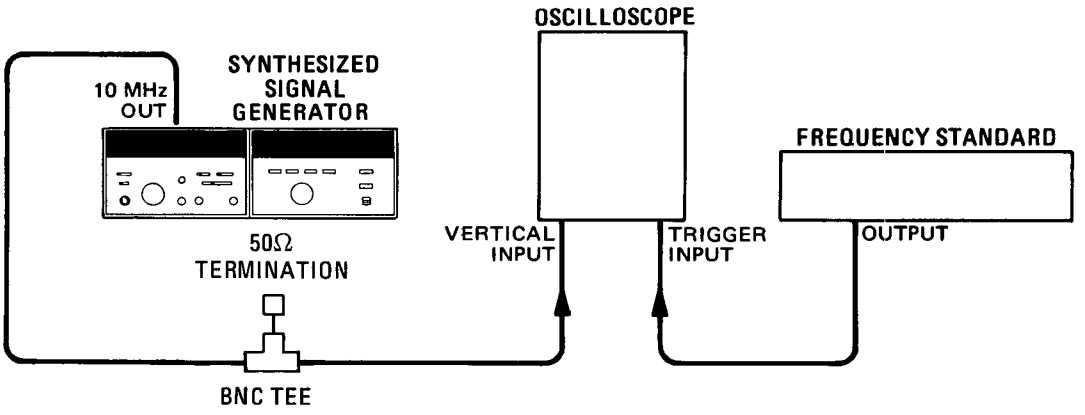


Figure 4-17. Internal Time Base Aging Rate Test Setup

EQUIPMENT:

Frequency Standard	HP 5065A
Oscilloscope	HP 180C/1801A/1821A
50Ω Termination	HP 11593A

NOTE

Be sure the Synthesizer has had 30 days to warm up before beginning this test. If the Synthesizer was disconnected from the power line for less than 24 hours, only a 24 hour warm-up is needed.

PROCEDURE: 1. Set the rear panel FREQ REFERENCE INT-EXT switch to the INT position.

PERFORMANCE TESTS

4-30. INTERNAL TIME BASE AGING RATE (Cont'd)

2. Connect the equipment as shown in Figure 4-17.
3. Adjust the oscilloscope controls for a stable display of the 100 MHz Synthesizer output.
4. Measure the time required for a phase change of 360°. Record the time (T_1) in seconds.

   T_1 = _____ s

5. Wait for a period of time (from 3 to 24 hours) and re-measure the phase change time. Record the period of time between measurements (T_2) in hours and the new phase change time (T_3) in seconds.

   T_2 = _____ h

   T_3 = _____ s

6. Calculate the aging rate from the following equation:

$$\text{Aging Rate} = \left| \left(\frac{1 \text{ cycle}}{f} \right) \left(\frac{1}{T_1} - \frac{1}{T_3} \right) \left(\frac{T}{T_2} \right) \right|$$

where: 1 cycle = the phase change reference for the time measurement (in this case, 360°)
f = Synthesizer's reference output frequency (10 MHz)
T = specified time for aging rate (24h)
T_1 = initial time measurement (s) for a 360° (1 cycle) change
T_2 = time between measurements (h)
T_3 = final time measurement (s) for a 360° (1 cycle) change

for example:

if T_1 = 351s
T_2 = 3h
T_3 = 349s

then:

$$\text{Aging Rate} = \left| \left(\frac{1 \text{ cycle}}{10 \text{ MHz}} \right) \left(\frac{1}{351\text{s}} - \frac{1}{349\text{s}} \right) \left(\frac{24\text{h}}{3\text{h}} \right) \right|$$

$$= 1.306 \times 10^{-11}$$

7. Verify that the aging rate is less than 5×10^{-10}.

NOTE

If the absolute frequencies of the frequency standard and the Synthesizer's reference oscillator are extremely close, the measurement time in steps 5 and 6 (T_1 and T_3) can be reduced by measuring the time required for a phase change of something less than 360°. Change 1 cycle in the formula (i.e., 180° = 1/2 cycle, 90° = 1/4 cycle).

8. If the aging rate is not within the required tolerance, refer to Section VIII, Service Sheet 2 for troubleshooting information. Be sure sufficient warm-up time has been allowed.

Table 4-4. Performance Test Record (1 of 5)

Hewlett-Packard Company
Model 8672A
Synthesized Signal Generator

Tested by _____

Serial Number _____

Date _____

Para. No.	Test	Results		
		Min.	Actual	Max.
4-12.	**OUTPUT LEVEL FLATNESS** Total Variation			
	2.0—6.2 GHz ±0.75 dB		_____	1.50 dB
	2.0—12.4 GHz ±1.00 dB		_____	2.00 dB
	2.0—18.0 GHz ±1.25 dB		_____	2.50 dB
4-13.	**HARMONICS AND SUBHARMONICS** Ratio of Harmonics and Subharmonics Amplitude to Carrier Amplitude, 25 dB minimum			
	Fundamental — Harmonic or Subharmonic			
	2000 MHz 2f 4000 MHz	25 dB	_____	
	3000 MHz 2f 6000 MHz	25 dB	_____	
	2000 MHz 3f 6000 MHz	25 dB	_____	
	8266.668 MHz 1/2f 4133.334 MHz	25 dB	_____	
	12 400.002 MHz 1/3f 4133.334 MHz	25 dB	_____	
	12 400.002 MHz 2/3f 8266.668 MHz	25 dB	_____	
4-14.	**SWR**			
	3 GHz SWR <2.50		_____(√)	
	6 GHz SWR <2.50		_____(√)	
	9 GHz SWR <2.50		_____(√)	
	12 GHz SWR <2.50		_____(√)	
	15 GHz SWR <2.50		_____(√)	
	18 GHz SWR <2.50		_____(√)	
4-15.	**FM ACCURACY**			
	at 100 kHz rate Meter Accuracy ±10%	210	_____	270 kHz-pk
	Accuracy relative to input level ±7%	0.53	_____	0.61 Vrms
4-16.	**AM DISTORTION** for rates < 10 kHz			
	30% AM Depth <3%		_____	3%
	50% AM Depth <4%		_____	4%
	75% AM Depth <5%		_____	5%

Table 4-4. Performance Test Record (2 of 5)

Para. No.	Test		Results Min.	Actual	Max.
4-17.	**AMPLITUDE MODULATION DEPTH, METER ACCURACY AND INPUT ACCURACY**				
	Detected AM Signal	75% AM	140	_____	160 mVrms
		60% AM	110	_____	130 mVrms
		50% AM	90	_____	110 mVrms
		30% AM	57	_____	63 mVrms
	AM Drive Signal	75% AM	460	_____	601 mVrms
		60% AM	354	_____	495 mVrms
		50% AM	283	_____	424 mVrms
		30% AM	636	_____	778 mVrms
4-18.	**NON-HARMONICALLY RELATED SPURIOUS SIGNALS**				
	2.0—6.2 GHz	< −70 dB	70 dB down	_____ √	
4-19.	**POWER LINE RELATED SPURIOUS**				
	F_c = 2.0—6.2 GHz				
	f_o < 300 Hz	−50 dBc	50 dB down	_____	
	300 Hz ≤ f_o ≤ 1 kHz	−60 dBc	60 dB down	_____	
	f_o > 1 kHz	−65 dBc	65 dB down	_____	
	F_c = 6.2—12.4 GHz				
	f_o < 300 Hz	−44 dBc	44 dB down	_____	
	300 Hz ≤ f_o ≤ 1 kHz	−54 dBc	54 dB down	_____	
	f_o > 1 kHz	−59 dBc	59 dB down	_____	
	F_c = 12.4—18.0 GHz				
	f_o < 300 Hz	−40 dBc	40 dB down	_____	
	300 Hz ≤ f_o ≤ 1 kHz	−50 dBc	50 dB down	_____	
	f_o > 1 kHz	−55 dBc	55 dB down	_____	
4-20.	**SINGLE-SIDEBAND PHASE NOISE RATIO**				
	SSB level in 1 Hz BW and CW mode at specified offset frequencies				
	2.0—6.2 GHz	10 Hz	−58 dBc	54.8 dB down	_____
		100 Hz	−70 dBc	62.0 dB down	_____
		1 kHz	−78 dBc	60.0 dB down	_____
		10 kHz	−86 dBc	58.0 dB down	_____
		100 kHz	−110 dBc	72.0 dB down	_____
	6.2—12.4 GHz	10 Hz	−52 dBc	48.8 dB down	_____
		100 Hz	−64 dBc	56.0 dB down	_____
		1 kHz	−72 dBc	54.0 dB down	_____
		10 kHz	−80 dBc	52.0 dB down	_____
		100 kHz	−104 dBc	66.0 dB down	_____

(continued)

Table 4-4. Performance Test Record (3 of 5)

Para. No.	Test			Min.	Results Actual	Max.
4-20.	**SINGLE-SIDEBAND PHASE NOISE RATIO (Cont'd)**					
	12.4—18.0 GHz	10 Hz	−48 dBc	44.8 dB down	_____	
		100 Hz	−60 dBc	52.0 dB down	_____	
		1 kHz	−68 dBc	50.0 dB down	_____	
		10 kHz	−76 dBc	48.0 dB down	_____	
		100 kHz	−100 dBc	62.0 dB down	_____	
4-21.	**FM FREQUENCY RESPONSE**					
	Relative to 100 kHz rate					
	±2.0 dB	3 kHz		−2.0 dB	_____	+2.0 dB
		30 kHz		−2.0 dB	_____	+2.0 dB
		300 kHz		−2.0 dB	_____	+2.0 dB
		1000 kHz		−2.0 dB	_____	+2.0 dB
		3000 kHz		−2.0 dB	_____	+2.0 dB
4-22.	**FM HARMONIC & NON-HARMONIC DISTORTION**					
	<3 kHz	<12%			_____	12%
	20 kHz to 100 Hz	⩽5%			_____	5%
4-23.	**RESIDUAL FM IN FM AND CW MODES**					
	300 Hz — 3 kHz Post Detection Bandwidth					
	2.000—6.199 GHz				_____	16 Hz-rms
	6.200—12.399 GHz				_____	32 Hz-rms
	12.400—18.000 GHz				_____	48 Hz-rms
	50 Hz—15 kHz Post Detection Bandwidth					
	2.000—6.199 GHz				_____	80 Hz-rms
	6.200—12.399 GHz				_____	160 Hz-rms
	12.400—18.000 GHz				_____	240 Hz-rms
4-24.	**RF OUTPUT LEVEL AND ACCURACY**					
	2.0 GHz ⩽ f_o < 6.2 GHz					
	0 dBm range	±1.75 dB		−1.75	_____	+1.75 dBm
	−10 dBm range	±2.25 dB		−12.25	_____	−7.75 dBm
	−20 dBm range	±2.45 dB		−22.45	_____	−17.55 dBm
	−30 dBm range	±2.65 dB		−32.65	_____	−27.35 dBm
	−40 dBm range	±2.95 dB		−42.95	_____	−37.05 dBm
	−50 dBm range	±3.25 dB		−53.25	_____	−46.75 dBm
	−60 dBm range	±3.55 dB		−63.55	_____	−56.45 dBm

Table 4-4. Performance Test Record (4 of 5)

Para. No.	Test	Results		
		Min.	Actual	Max
4-24.	**RF OUTPUT LEVEL AND ACCURACY (Cont'd)**			
	6.2 GHz $\leq f_o <$ 12 GHz			
	0 dBm range ±2.00 dB	−2.00	_____	+2.00 dBm
	−10 dBm range ±2.50 dB	−12.50	_____	−7.50 dBm
	−20 dBm range ±2.70 dB	−22.70	_____	−17.30 dBm
	−30 dBm range ±2.90 dB	−32.90	_____	−27.10 dBm
	−40 dBm range ±3.20 dB	−43.20	_____	−36.80 dBm
	−50 dBm range ±3.50 dB	−53.50	_____	−46.50 dBm
	−60 dBm range ±3.80 dB	−63.80	_____	−56.20 dBm
	12.4 GHz $\leq f_o \leq$ 18.0 GHz			
	0 dBm range ±2.25 dB	−2.25	_____	+2.25 dBm
	−10 dBm range ±2.85 dB	−12.85	_____	−7.15 dBm
	−20 dBm range ±3.05 dB	−23.05	_____	−16.95 dBm
	−30 dBm range ±3.45 dB	−33.45	_____	−26.55 dBm
	−40 dBm range ±3.85 dB	−43.85	_____	−36.15 dBm
	−50 dBm range ±4.25 dB	−54.25	_____	−45.75 dBm
	−60 dBm range ±4.65 dB	−64.65	_____	−55.35 dBm
	Following levels relative to −60 dBm level			
	2.0 GHz $\leq f_o \leq$ 6.2 GHz			
	−70 dBm range	9.7	_____	10.3 dB down
	−80 dBm range	19.4	_____	20.6 dB down
	−90 dBm range	29.1	_____	30.9 dB down
	−100 dBm range	38.8	_____	41.2 dB down
	−110 dBm range	48.5	_____	51.5 dB down
	6.2 GHz $\leq f_o \leq$ 12.4 GHz			
	−70 dBm range	9.7	_____	10.3 dB down
	−80 dBm range	19.4	_____	20.6 dB down
	−90 dBm range	29.1	_____	30.9 dB down
	−100 dBm range	38.8	_____	41.2 dB down
	−110 dBm range	48.5	_____	51.5 dB down
	12.4 GHz $\leq f_o \leq$ 18.0 GHz			
	−70 dBm range	9.6	_____	10.4 dB down
	−80 dBm range	19.2	_____	20.8 dB down
	−90 dBm range	28.8	_____	31.2 dB down
	−100 dBm range	38.4	_____	41.6 dB down
	−110 dBm range	48.0	_____	52.0 dB down
4-25.	**INCIDENTAL PHASE AND FREQUENCY MODULATION**			
	At 10 kHz rate and 30% AM Depth < 7 kHz (0.7 radians)	2.35 dB down	_____	
4-26.	**FREQUENCY SWITCHING TIME**			
	Switching down <15 ms		_____	15 ms
	Switching up <15 ms		_____	15 ms

Table 4-4. Performance Test Record (5 of 5)

Para. No.	Test	Results		
		Min.	Actual	Max.
4-27.	**OUTPUT LEVEL SWITCHING TIME** <20 ms		_____	20 ms
4-28.	**AM RATES** 3 dB bandwidth 10 Hz to 100 kHz	3.5 div.	_____	
4-29.	**INCIDENTAL AM** rates ≤100 kHz; peak deviation ≤1 MHz <10%		_____	10%
4-30.	**INTERNAL TIME BASE AGING RATE**	5×10^{-10}/day	_____	

SECTION V
ADJUSTMENTS

5-1. INTRODUCTION

5-2. This section contains adjustments and checks that assure peak performance of the Synthesizer. This instrument should be readjusted after repair or failure to pass a performance test. Allow a 30 minute warm-up prior to performing the adjustments.

5-3. The order in which the adjustments are made is critical. Prior to making any adjustments, refer to the paragraph entitled Related Adjustments.

5-4. Determining the adjustments to be performed after a component failure and subsequent repair or a performance test failure is important. This will help keep the adjustment time to a minimum. After the repair and/or adjustment, performance tests are usually required to verify proper performance. Refer to the paragraph entitled Related Adjustments.

5-5. SAFETY CONSIDERATONS

5-6. This section contains information, cautions and warnings which must be followed for your protection and to avoid damage to the equipment.

WARNINGS

Maintenance described in this section is performed with power supplied to the instrument and with protective covers removed. Maintenance should be performed only by service trained personnel who are aware of the hazard involved (for example, fire and electrical shock). Where maintenance can be performed without power applied, the power should be removed.

A pin-to-pin voltage difference of 60 Vdc may be found on many of the Synthesizer's circuit board connectors. Be careful while working on the circuit boards with power supplied to the instrument.

If a circuit board is placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

5-7. EQUIPMENT REQUIRED

5-8. Each adjustment procedure contains a list of required test equipment and accessories. The test equipment is identified by callouts in the test setup diagrams included with each procedure.

5-9. If substitutions must be made for the specified test equipment, refer to Table 1-2 for the minimum specifications. It is important that the test equipment meet the critical specifications listed in the table if the Synthesizer is to meet its performance requirements.

5-10. The HP 11712A Service Kit is an accessory item available from Hewlett-Packard for use in maintaining the Synthesizer.

5-11. FACTORY SELECTED COMPONENTS

5-12. Factory selected components are identified on the schematics and parts list by an asterisk which follows the reference designator. The normal value or range of the components are shown. The manual change sheets will provide updated information pertaining to the selected components. Table 5-1 lists the reference designator, the criterion used for selecting a particular value, the normal value range, and the service sheet where the component part is shown.

5-13. RELATED ADJUSTMENTS

5-14. If all the adjustments are to be performed, they should be done in order with the exception of the A2 Assembly Adjustments. These adjustments should be performed after the M/N Loop Adjustments and before the YTO Sampler Adjustments.

5-15. In the event of a performance test or component failure, it must be determined if an adjustment procedure should be performed or if the instrument should be repaired. Tables 5-2 and 5-3 indicate the required action in either case.

5-16. After the instrument is repaired and/or adjusted, performance test(s), a frequency check and verification of phase lock or all of these things must be done to verify proper performance of the

RELATED ADJUSTMENTS (Cont'd)

Synthesizer. Tables 5-2 and 5-3 contain the necessary information that provides assurance of proper performance.

5-17. Prior to performing the adjustment procedures, refer to the disassembly procedures in Section VIII. These procedures cover the removal of the top and bottom covers, the internal A1 and A2 assembly covers, and the A3A9 YTO Loop Assembly.

5-18. ADJUSTMENT LOCATIONS

5-19. The last foldouts in this manual contain figures that show the locations of assemblies, adjustments, test points and chassis parts.

Table 5-1. Factory Selected Components

Reference Designator	Service Sheet	Range of Values	Basis of Selection
A1A13R1	1—A1	82.5kΩ to 1 MΩ	Matched to the A1A13A1 Preamplifier at the factory.
A2A8C7	10—A3	100—470 pF	Selected for correct output frequency.
A3A1A2C8	2—A3	0 to 12.0 pF	Centers frequency adjustment range of A3A1A2C4 about 100 MHz. Refer to the VCXO Adjustment procedure.
A3A1A2L4	2—A3	0.22 to 0.68 μH	
A3A1A2R67, R68 and R69	2—A3	Refer to Table in VCXO Adjustment	Required change in attenuation necessary for a −10 dBm output level of the 400 MHz signal. Refer to VCXO Adjustment procedure.
A3A1A5C38, R36, R40 & R41	5—A3	R36: 82.5 to 56.2Ω R41: 100Ω or deleted R40: 51.1Ω or C38 at 27 pF.	If the power output from the IF OUT jack (A3A1A5J2 is less than −5 dBm at any frequency between 5 MHz to 65 MHz replace R36 82.5Ω with a 56.2Ω resistor, R40 51.1Ω resistor with C38 27 pF capacitor, and remove R41. Proper power output level is 0 ±5 dBm from 5 to 65 MHz. If this range cannot be met, service may be required.
A3A3R43	12—A3	12 kΩ to 14.7kΩ	Select so that pin 2 of U1 Power Up/Down Detector is 0.1 to 0.2V lower than the +5.2V Power Supply.
A3A7C19	10—A3	160 or 220 pF	Matched to the part number of A3A9A3 2.0—6.2 GHz YTO Assembly . 160 pF with HP 5086-7131; 220 pF with HP 5086-7242.
A3A7C48	10—A3	3.9 to 5.6 pF	Selected for frequency response on the 100 kHz and lower FM deviation ranges. Use the FM Frequency Response Test Setup (test oscillator and spectrum analyzer only). Set the test oscillator's controls so that the spectrum analyzer's display of the first FM sidebands are 30 dB down from carrier at 1 MHz. At 3.16 MHz the sidebands should be 40 dB down; at 10 MHz, 50 dB down. If the response is peaking, insert a smaller value capacitor. If the response is rolling off, insert a larger value capacitor.
A3A7R61, R65 and R75	10—A3	R61: 1620 or 1960Ω R75: 1780 or 2150Ω R65: 3.16 to 11.0 kΩ	Normal values for sensitivity of 10 MHz-pk/Vrms from front panel; R61, 1960Ω; R75, 1820Ω; R65, 5110Ω. If sensitivity is low, change R75 to 2150Ω; R65 to 3830Ω. If sensitivity is high, change R61 to 1620Ω; R75 to 1780Ω; R65 to 9090Ω. Measure the dc voltage on the emitter of Q5. If more negative than −8.0 Vdc, reduce the value of R65; if more positive than −0.5 Vdc, increase the value of R65.
A3A7R67	10—A3	75 or 178Ω	Matched to the part number of A3A9A3 2.0—6.2 GHz YTO Assembly: 178Ω with HP 5086-7131; 75Ω with HP 5086-7242.
A3A9A4R20	9—A3	348Ω to 1.21 kΩ	YTO Loop gain crossover of 20 ±2 kHz. Refer to the YTO Loop Phase Detector Adjustment.

Table 5-2. Performance Test Failure and Required Action (1 of 2)

Performance Test Failure[1]	Adjustment or Repair	Repeat Performance Test(s)
Output Level Flatness —or— RF Output Level and Accuracy	ALC Adjustments Output Attenuator or Output Cable malfunction.	Output Level Flatness. RF Output Level and Accuracy. All AM Tests.
SWR	Refer to Section VIII for repair information (no adjustment). Output attenuator or cable malfunction.	SWR
Harmonics and Subharmonics	YTM and ALC Adjustments or YTM failure.	Output Level Flatness. RF Output Level and Accuracy. Harmonics and Subharmonics.
Non-Harmonically Related Spurious	This problem may occur anywhere in the instrument. Isolate the defective component and make adjustments as required (see Table 5-3).	Non-Harmonically Related Spurious. Other tests are as required.
Power Line Related Spurious	Refer to Section VIII, SS12-A3.	Power Line Related Spurious.
Single-Sideband Phase Noise Ratio	YTO Driver VCXO, M/N Loop, 20/30 Loop VCO, 20/30 Loop Bias, YTO Sampler, YTO Phase Detector, YTO Offset and FM Overmodulation, and FM Driver Adjustments.	Check for phase lock. Single-Sideband Phase Noise Ratio. All FM tests.
AM Distortion	Repair of AM or ALC circuits required.[2] Adjustment (if any) related to repair.	Related to Repair.
AM Depth Meter Accuracy, and Input Accuracy	For incorrect meter accuracy, perform the AM Meter Adjustment; for incorrect input accuracy, troubleshoot the AM and ALC circuits.	AM Depth Meter Accuracy and Input Accuracy.
AM Rates (3 dB Bandwidth)	AM Bandwidth Adjustment	AM Rate (3 dB Bandwidth).
Incidental Phase and Frequency Modulation	Repair AM, YTM, or ALC circuits (see Table 5-3).	Related to Repair.
FM Accuracy —or— FM Frequency Response	FM Driver Adjustment FM Adjustments	All FM tests.
FM Distortion	First perform FM Driver Adjustments; then, if necessary, repair FM Driver or FM Input Circuits (see Table 5-3).	All FM tests.
Residual FM in FM and CW Modes	Check FM Driver for hum, noise or ground loops. Check the YTO Loop for "solid" phase lock.	Single-Sideband Phase Noise Ratio.

[1] If the output frequency is incorrect or any of the phase lock loops are unlocked, make the appropriate adjustments and (if necessary) refer to Section VIII for repair information. After adjustment or repair, check for the correct frequency and verify that the phase lock loops are locked. Perform the single-sideband phase noise ratio test.

[2] Excessive AM distortion (clipping) in the +10 dBm OUTPUT LEVEL RANGE may occur. Reducing the output level by setting the range to 0 dBm or turning the VERNIER ccw should reduce the AM distortion to an acceptable level.

Table 5-2. Performance Test Failure and Required Action (2 of 2)

Performance Test Failed[1]	Adjustment or Repair	Repeat Performance Test(s)
Incidental AM	Repair or adjust the YTM and ALC circuits (see Table 5-3).	Output Level Flatness. RF Output Level Accuracy. Harmonics and Sub-Harmonics. Incidental AM.
Frequency Switching Time	Repair or adjust the YTO Loop or the remote programming circuit boards A2A7 and A2A9.	Frequency Switching Time.
Output Level Switching Time	Repair the output attenuator driver; replace the output attenuator	Output Level Switching Time.
Internal Time Base Aging Rate	Replace A3A8 or repair power supply.[2]	Internal Time Base Aging Rate.

[1] If the output frequency is incorrect or any of the phase lock loops are unlocked, make the appropriate adjustments and (if necessary) refer to Section VIII for repair information. After adjustment or repair, check for the correct frequency and verify that the phase lock loops are locked. Perform the single-sideband phase noise ratio test.

[2] Be sure sufficient warm-up time has been allowed. It may require up to 30 days.

Table 5-3. Related Adjustments (1 of 2)

Assembly Repaired	Adjustments	Performance Test(s)
YTM Assembly A1A3	YTM and ALC Adjustments	RF Output Level and Accuracy
YTM and ALC Circuits A1A5, A6, A7, A8, AT3	YTM Alignment ALC Adjustments External Leveling Adjustments	Output Level Flatness. RF Output Level and Accuracy. Harmonics and Sub-Harmonics
AM Bandwidth Circuits Only — A1A5	AM Bandwidth Adjustments.	AM Rate (3 dB Bandwidth)
External Leveling Circuits Only — A1A6	External Leveling Adjustments	None
AM Meter Circuits Only — A1A9	AM Meter Adjustments	AM Depth, Meter Accuracy, and Input Accuracy
FM Circuits — A1A9	FM Adjustments	All FM Tests.
100 mW Power Amplifier Assembly — A1A12	YTM Adjustments	RF Output Level and Accuracy Output Level Flatness Harmonics and Subharmonics AM Distortion
Programmable Attenuator 110 dB — A1AT1	ALC Adjustments	RF Output Level and Accuracy Output Level Switching Time SWR
PIN Modulator — A1AT3	ALC and AM Adjustments	AM Distortion RF Output Level and Accuracy Output Level Flatness

Table 5-3. Related Adjustments (2 of 2)

Assembly Repaired	Adjustments	Performance Tests(s)
Directional Coupler Cable Assembly (Options 001 and 005 only) — A1W7	ALC Adjustments	SWR RF Output Level and Accuracy Output Level Flatness
A2A3 VCO 160—240 MHz Assembly	20/30 Loop VCO Adjustment	Single-Sideband Phase Noise Ratio[1] Power Line Related Spurious
A2A4 20/30 Phase Detector Assembly	A2A4 Assembly Notch Filter Adjustments	Non-Harmonically Related Spurious
A2A5 20/30 Divider Assembly	20/30 Loop Divider Bias Adjustment	Single-Sideband Phase Noise Ratio[1]
Reference Loop Circuits A3A1A1, A2	VCXO Adjustments	Single-Sideband Phase Noise Ratio[1] Power Line Related Spurious
M/N Loop Circuits A3A1A3, A4, A5	M/N Loop Adjustments	Single-Sideband Phase Noise Ratio[1] Power Line Related Spurious
Power Supplies A3A2, A3, A4	Power Supply Adjustments	None unless required by preceding problems.
A3A5 DAC Assembly	Digital-to-Analog Converter Adjustments	Single Sideband Phase Noise Ratio[1]
A3A6 YTO Driver Assembly	YTO Driver Adjustment	Single-Sideband Phase Noise Ratio[1]
A3A7 FM Driver Assembly	FM Driver Adjustments	Single-Sideband Phase Noise Ratio[1] All FM Tests
10 MHz Reference Oscillator Assembly — A3A8	10 MHz Reference Oscillator	Single Sideband Phase Noise Ratio[1] Power Line Related Spurious Internal Time Base Aging Rate
2—6.2 GHz YTO Assembly — A3A9A3	Power Supply, DAC, YTO Driver, YTO Loop, FM Driver, FM Mod Meter, Loop Offset and Over Modulation	Single Sideband Phase Noise Ratio[1] Power Line Related Spurious All FM tests Frequency Switching Time
A3A9A4 YTO Phase Detector Assembly	YTO Loop Phase Detector Adjustments YTO Loop Offset and FM Overmodulation Adjustments	Single-Sideband Phase Noise Ratio[1]
A3A9A5 YTO Sampler Assembly	YTO Loop and Sampler Adjustments	Single-Sideband Phase Noise Ratio[1]
RF Output Cable (except Options 001 and 005) — A1W8		SWR Output Level Flatness

[1] Check for correct frequency output and verify the phase lock loops are locked before performing the Single-Sideband Phase Noise Ratio test.

ADJUSTMENTS

5-20. A3 RF SOURCE ASSEMBLY ADJUSTMENTS

5-21. Power Supply Adjustments

REFERENCE: Service Sheets 11-A3, 12-A3, and 13-A3.

DESCRIPTION: Adjust the +22 volt and +20 volt power supplies to their required tolerance. Check the remaining supply voltages for which the +20 volt supply is the reference (+11V, +5.2V, −5.2V, −10V, and −40V).

EQUIPMENT: Digital Voltmeter . . . . . HP 3455A

PROCEDURE:

1. Remove the Synthesizer's top cover.
2. Set the LINE switch to ON; set the rear panel FREQ STANDARD INT/EXT switch to INT.
3. Connect the DVM input to A3A2TP1.
4. Adjust +22 ADJ A3A2R2 for a DVM reading of +22.00 ±0.02 Vdc.
5. Connect the DVM input to A3A3TP5.
6. Set +20 ADJ A3A3R50 for a DVM reading of +20.0 ±0.001 Vdc.
7. Check the following power supplies as shown in the table. If any voltages are incorrect, try resetting A3A3R50 for the correct +20V, +5.2V, −5.2V, −10V, and −40 Vdc levels. All voltages should be within tolerance. If necessary refer to troubleshooting information in Section VIII. Repair the supply in question and recheck the voltage.

Power Supply	Test Point	Power Supply Voltage (Vdc)	
		Min.	Max.
+11 Vdc	A3A3TP6	+9.9	+12.1
+5.2 Vdc	A3A3TP2	+5.1	+5.3
−5.2 Vdc	A3A4TP5	−5.1	−5.3
−10 Vdc	A3A4TP4	−9.8	−10.2
−40 Vdc	A3A4TP1	−39.00	−40.60

8. Perform the performance tests as required by 1) the test failure that led to this adjustment procedure or 2) the assembly that was repaired that led to this adjustment procedure.

ADJUSTMENTS

5-22. 10 MHz Reference Oscillator Adjustment

REFERENCE: Service Sheet 1-A3.

DESCRIPTION: Connect reference signal from the Synthesizer (10 MHz OUT) to the oscilloscope's vertical input. A frequency standard (with long term stability greater than 1×10^{-10}) is connected to the trigger input. Adjust the A3A8 Assembly's FREQ adjustment for a minimum drift rate.

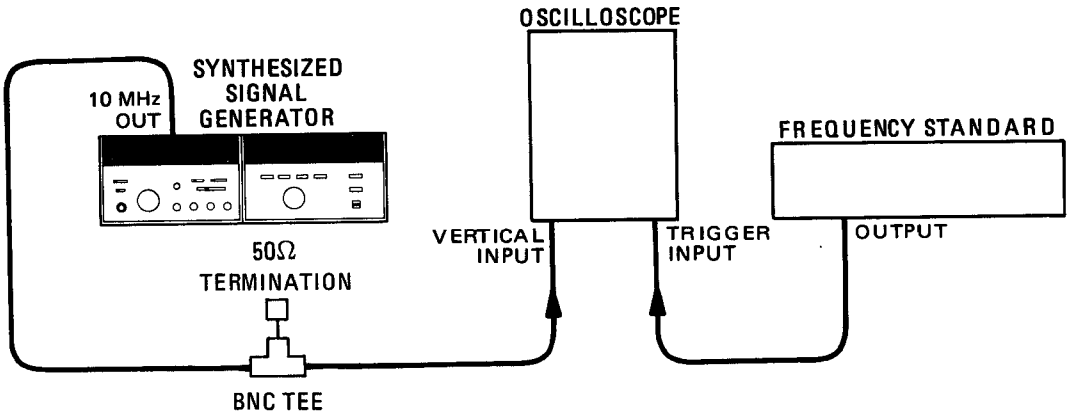


Figure 5-1. 10 MHz Reference Oscillator Adjustment Test Setup

EQUIPMENT:

Frequency Standard	HP 5065A
Oscilloscope	HP 180C/1801A/1821A
50Ω Termination	HP 11593A

NOTE

Be sure the Synthesizer has had 30-minutes to warm up before performing the adjustment. Verify that the oven and phase lock status indicators are not lit. If necessary, refer to the trouble-shooting information in Section VIII.

PROCEDURE:

1. Set the rear panel FREQ STANDARD INT EXT switch to the INT position.
2. Set the FREQ adjustment (on the A3A8 Assembly) so the signal, as observed on the oscilloscope display, is not drifting.
3. Verify that in 10 seconds the display drifts less than 360°. A drift of 360° in 10 seconds corresponds to a setting accuracy of 1×10^{-8}. Setting accuracy is not specified for this instrument; the numbers shown are what can typically be obtained.

ADJUSTMENTS

5-23. Digital-to-Analog Converter Adjustment

REFERENCE: Service Sheet 6-A3.

DESCRIPTION: The adjustments set the analog output voltages with respect to the digital frequency inputs. Adjustments are made at certain selected frequencies of which some are below the low frequency limit of the Synthesizer (2000 MHz). These frequencies are selected by shorting the test point pair A2A8TP1 and tuning to the specified frequencies.

EQUIPMENT: Digital Voltmeter . . . . . HP 3455A

PROCEDURE:

1. Set the Synthesizer's controls as follows:

   RF switch . . . . . ON
   ALC mode switch . . . . . INT
   TUNING control (adjust for frequency of) . . 4800.000 MHz

2. Press the HOLD key.

3. Connect the DVM ground lead to the reference ground, A3A6TP5. (The ground lead remains connected here for the remainder of this procedure). Be sure the A3A6 assembly is properly installed in the instrument.

4. Attach the DVM test lead to A3A5TP4. Set Ref Adj (Reference Buffer output) A3A5R13 for a DVM reading of −6.50 ± 0.07 Vdc.

5. Check the output voltages of the Reference Buffers at A3A5TP1 (+10.75 ±0.25 Vdc) and A3A5TP2 (+10.00 ±0.15 Vdc). Make repairs if necessary.

6. Connect the DVM to the YTO Pretune Output, A3A5TP3.

7. Set frequency to 4800 MHz. Short the test point pair, A2A8TP1, with an alligator clip. Adjust 1.6 GHz A3A5R4 (not 1.61) to obtain −4.800 ±0.001 Vdc. Obtain an accuracy of ±0.0001 Vdc if possible in this and succeeding steps.

8. Remove the clip from A2A8TP1. Adjust 4.8 GHz A3A5R3 to obtain a reading of −14.400 ±0.001 Vdc.

9. Tune to 4900.000 MHz and short the test point pair A2A8TP1 with the clip. Adjust 1.7 GHz A3A5R29 to obtain −5.100 ± 0.001 Vdc.

10. Repeat steps 7, 8, and 9 until all voltages are within 0.001 Vdc of the specified value.

11. Tune the frequency to 4810.000 MHz. Verify that the clip is connected to A2A8TP1. Adjust 1.61 GHz A3A5R42 (not 1.6) to obtain a DVM reading of −4.830 ± 0.001 Vdc.

12. Tune to 5000.000 MHz. Adjust 1.8 GHz A3A5R24 to obtain −5.400 ±0.001 Vdc.

13. Remove the alligator clip. Tune to 2000.000 MHz. Adjust 2.0 GHz A3A5R22 to obtain −6.000 ± 0.001 Vdc.

ADJUSTMENTS

5-23. Digital-to-Analog Converter Adjustment (Cont'd)

14. Tune to 2400.000 MHz. Adjust 2.4 GHz A3A5R20 to obtain −7.200 ±0.001 Vdc.

15. Tune to 3200.000 MHz. Adjust 3.2 GHz A3A5R18 to obtain −9.600 ±0.001 Vdc.

16. At each frequency listed in the table, check the YTO Pretune voltage at A3A5TP3 with the clip attached to the test point pair A2A8TP1.

Synthesizer Frequency	Voltage at A3A5TP3 (Vdc)
4.801 GHz	−4.803 ± 0.001
4.802 GHz	−4.806 ± 0.001
4.804 GHz	−4.812 ± 0.001
4.808 GHz	−4.824 ± 0.001
4.810 GHz	−4.830 ± 0.001
4.820 GHz	−4.860 ± 0.001
4.840 GHz	−4.920 ± 0.001
4.880 GHz	−5.040 ± 0.001

17. Tune to 4910.000 MHz. At A3A5TP3 the YTO Pretune voltage should be −5.130 ± 0.002 Vdc with the clip in place and −14.730 ± 0.002 Vdc with the clip removed. If necessary repeat the procedure. Then if the voltage tolerance cannot be met, refer to Section VIII for troubleshooting information.

18. Remove the DVM and clip lead.

5-24. YTO Driver Adjustment

REFERENCE: Service Sheet 7-A3.

DESCRIPTION: When the fundamental output of the Synthesizer is set to the maximum and minimum frequencies, the YTO Driver's gain and offset current are set to give specified YTO output frequencies.

EQUIPMENT: Frequency Counter . . . . . HP 5340A

PROCEDURE: 1. Set the Synthesizer's RF switch to ON.

NOTE

All boards must be installed in the instrument before these adjustments are made.

5-24. YTO Driver Adjustment (Cont'd)

2. Connect the frequency counter to the RF OUTPUT connector A1J1.

3. Connect the reference ground A3A6TP5 to YTO Tune 1) A3A7TP2 with a jumper wire.

4. Tune the Synthesizer to 2000.000 MHz. Set 2 GHz Adj A3A6R34 to obtain 2000.0 ±0.1 MHz on the frequency counter.

5. Tune the Synthesizer to 6199.000 MHz. Set 6.199 GHz Adj A3A6R25 to obtain 6199.0 ±0.1 MHz on the frequency counter.

6. Repeat steps 4 and 5 as required to obtain the required tolerance at both frequencies.

7. Disconnect A3A6TP5 from A3A7TP2.

8. Verify that the frequency output is accurate to 1 kHz and that the phase lock loops are locked before performing the Single-Sideband Phase Noise Ratio performance test in Section IV.

5-25. Voltage Controlled Crystal Oscillator (VCXO) Adjustment

REFERENCE: Service Sheet 2-A3.

DESCRIPTION: The open loop frequency and maximum power output of the 100 MHz VCXO is centered around 100 MHz. The output is set as close as practical to 100 MHz. The 400 MHz signal is adjusted for maximum 400 MHz output and minimum spurious output. The attenuator is selected to provide a 400 MHz output of −10 dBm.

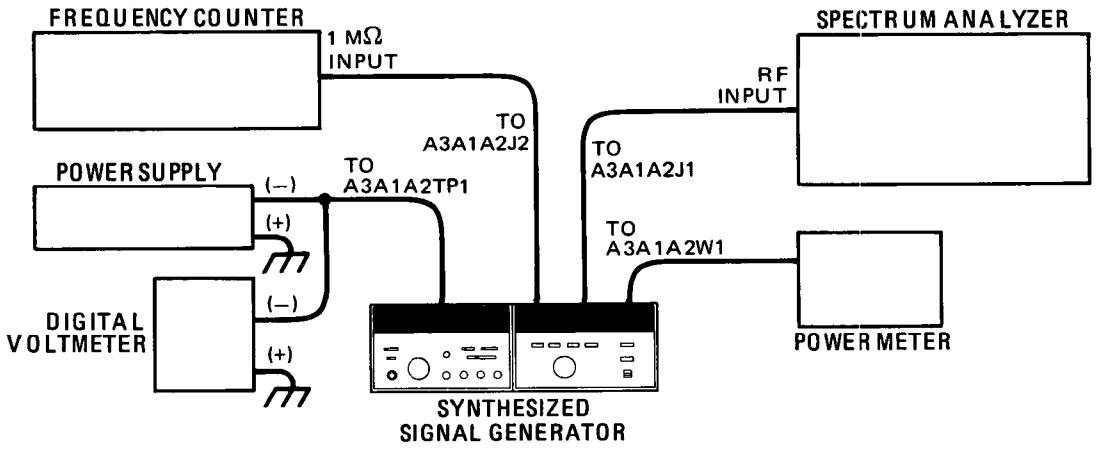


Figure 5-2. VCXO Adjustment Test Setup

ADJUSTMENTS

5-25. Voltage Controlled Crystal Oscillator (VCXO) Adjustment (Cont'd)

EQUIPMENT:

Frequency Counter	HP 5340A
Spectrum Analyzer	HP 8565A
Power Supply	HP 6202B
Power Meter	HP 436A/8481A
Digital Voltmeter	HP 3455A

PROCEDURE:

1. Connect the frequency counter to A3A1A2J2 in place of the termination; connect the spectrum analyzer to A3A1A2J1 in place of the gray-orange-white cable.

2. Set the output of a low voltage power supply to −8.00 ± 0.01 Vdc. Connect the positive lead to ground and the negative lead to A3A1A2TP1 TUNE.

3. Tune the 100 MHz Adj A3A1A2C4 for the maximum 100 MHz signal level as viewed on the spectrum analyzer display.

4. Tune the 100 MHz Adj to increase the frequency (and decrease the amplitude) until the oscillation stops on the high frequency side; then tune the 100 MHz Adj to decrease the frequency until the oscillation stops. If the VCXO does not stop oscillating at the high end, decrease the value of A3A1A2C8 by 1 pF from its present value. If it does not stop at the low end, increase the value of A3A1A2C8 by 1 pF. If a change is necessary, repeat this step.

5. Adjust the 100 MHz Adj to obtain the maximum signal level as viewed on the spectrum analyzer display. Slowly tune to a higher frequency until the power drops by 1 dB. Record Δf_1, that is, how far the 1 dB point is above 100 MHz. Use the frequency counter to make the measurements to 10 Hz resolution.

6. Tune to a lower frequency until the power is decreased 1 dB on the other side of the peak. Record Δf_2, that is, how far the 1 dB point is below 100 MHz.

7. The VCXO centering about 100 MHz is correct if $0.5 \leqslant \frac{\Delta f_1}{\Delta f_2} \leqslant 2$.

   If the ratio is less than 0.5, decrease A3A1A2L4 one value to increase the center frequency. If the ratio is greater than 2, increase A3A1A2L4 one value to decrease center frequency. Refer to the following table for the inductor values.

A3A1A2L4 Inductor Values

Value	HP Part Number
0.68 μH	9140-0141
0.56 μH	9100-2256
0.47 μH	9100-2255
0.39 μH	9100-2254
0.33 μH	9100-0368
0.27 μH	9100-2252
0.22 μH	9100-2251

8. If the inductor value is changed, repeat steps 3 through 7.

5-25. Voltage Controlled Crystal Oscillator (VCXO) Adjustment (Cont'd)

9. Adjust the 100 MHz Adj to obtain a VCXO output of 100 MHz ± 100 Hz.

10. Connect the spectrum analyzer to the 400 MHz output. Set the spectrum analyzer's controls for a center frequency of 500 MHz, frequency span per division 100 MHz and vertical sensitivity per division 10 dB log. Adjust the 400 MHz A3A1A2C3, C2 and C1 adjustments in that order to obtain the maximum 400 MHz signal with the lowest harmonic levels possible.

11. Check the various harmonics of 100 MHz relative to the 400 MHz level. 200 and 800 MHz should be greater than 25 dB down; 100, 300, 500, 600, 700, and 900 MHz should be greater than 40 dB down. If necessary, repeat steps 10 and 11.

12. Connect the power meter to the 400 MHz Output (the gray-red-white cable) after disconnecting it from A3A1A5J1. The power should be −10 to −11 dBm. If the power is incorrect, select the values of A3A1A2R67, R68 and R69 from the Table of Attenuator Resistor Values to obtain the proper power level. The attenuation should always be at least 3 dB or greater.

Attenuator Resistor Values

Attenuation (dB)	Resistors (ohms)		
	R67	R68	R69
3	261	17.8	261
4	215	23.7	215
5	178	31.6	178
6	147	38.3	147
7	133	46.4	133
8	121	51.1	121
9	110	61.9	110

13. If the amount of attenuation is changed, recheck the harmonic levels.

14. Verify that the frequency output is accurate to 1 kHz and that the phase locked loops are locked before performing the Single Sideband Phase Noise Ratio test.

5-26. M/N Loop Adjustments

REFERENCE: Service Sheet 4-A3.

DESCRIPTION: The M/N loop frequency is set to track tuning voltage across the frequency range. The output level is set and checked to ensure an adequate RF output level across the band.

ADJUSTMENTS

5-26. M/N Loop Adjustments (Cont'd)

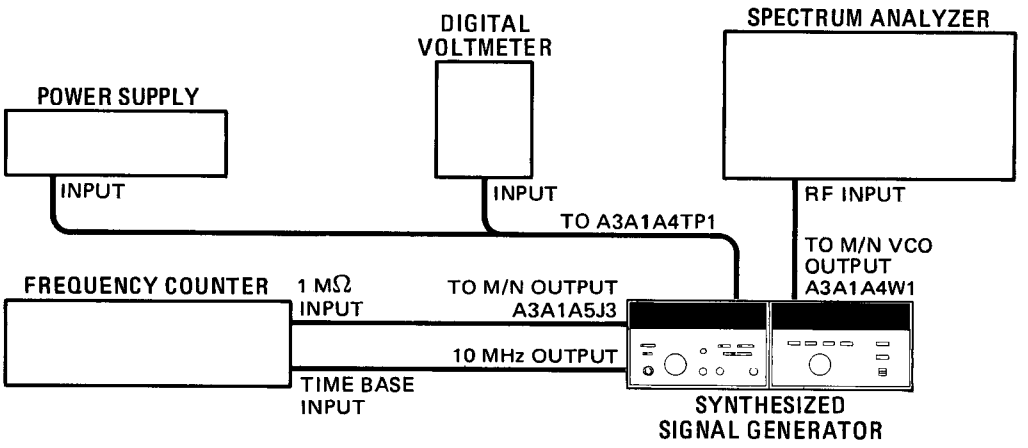


Figure 5-3. M/N Loop Adjustment Test Setup

EQUIPMENT:

Digital Voltmeter	HP 3455A
Frequency Counter	HP 5340A
Spectrum Analyzer	HP 8565A
Power Supply	HP 6202B

PROCEDURE:

1. Set the Synthesizer controls as follows:

RF Switch	ON
TUNING control	6090.000 MHz
FREQ REFERENCE INT-EXT switch	INT

2. Connect the equipment as shown in Figure 3.

3. Verify that the M/N output frequency is exactly 197.419 MHz ± 1 count.

NOTE

The adjustment screws for A3A1A4C1 and C5 are held in place by lock nuts. After making the adjustment, tighten the lock nuts and recheck the frequency and level.

WARNING

Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

4. Set the LINE switch to STANDBY; remove the A3A1A4/A5 Assembly and place it on a 30-pin extender board.

ADJUSTMENTS

5-26. M/N Loop Adjustments (Cont'd)

5. Connect the spectrum analyzer input to the M/N VCO output A3A1A4W1 (white coax).

CAUTION

Do not apply a positive voltage to A3A1A4TP1. A positive voltage will forward bias the VCO tuning diodes and may destroy them.

6. Set the LINE switch to ON; connect the positive output of a power supply to ground; connect the negative output to the A3A1A4TP1 TUNE. Set the power supply for −35.0 ± 0.5 Vdc.

NOTE

The adjustment screws for A3A1A4A1C1 and C5 are held in place by lock nuts. After making the adjustment, tighten the lock nuts and recheck the frequency and level.

7. Release the lock nut for the PWR adjustment A3A1A4A1C5. Adjust A3A1A4A1C5 for an output level of 0 ± 2 dBm. Tighten the lock nut.

8. Slowly reduce the dc voltage at A3A1A4TP1 while monitoring the VCO output power on the spectrum analyzer. The output power should be greater than −2 dBm between 395 MHz (−35 Vdc) and 355 MHz (−2.3 Vdc).

9. Remove the power supply connection to A3A1A4TP1. Set the LINE switch to STANDBY; then install the A3A1A4/5 assembly. Set the LINE switch to ON and verify that the frequency is still at 6090.000 MHz.

10. Set FREQ ADJ A3A1A4A1C1 for a voltage level of −35 ±0.5 Vdc, measured at A3A1A4TP1.

11. Tune the Synthesizer frequency to 2100.000 MHz. Verify that the M/N output frequency is 177.500 MHz and the tuning voltage is −2.4 ±0.7 Vdc.

NOTE

If required, proceed to the 20/30 MHz Loop VCO Pretune Adjustments.

12. Verify that the frequency output is accurate to 1 kHz and that the phase lock circuits are locked before performing the Single-Sideband Phase Noise Ratio performance test in Section IV.

5-27. YTO Loop Sampler Adjustments

REFERENCE: Service Sheet 8-A3.

DESCRIPTION: The sampler is driven by a sweep oscillator and the dc output is monitored with an oscilloscope. The sampler driver circuit is adjusted for maximum amplitude and flatness over the range of the M/N Loop. The Sampler's IF preamplifier is adjusted for correct output level and the frequency response is checked.

ADJUSTMENTS

5-27. YTO Loop Sampler Adjustments (Cont'd)

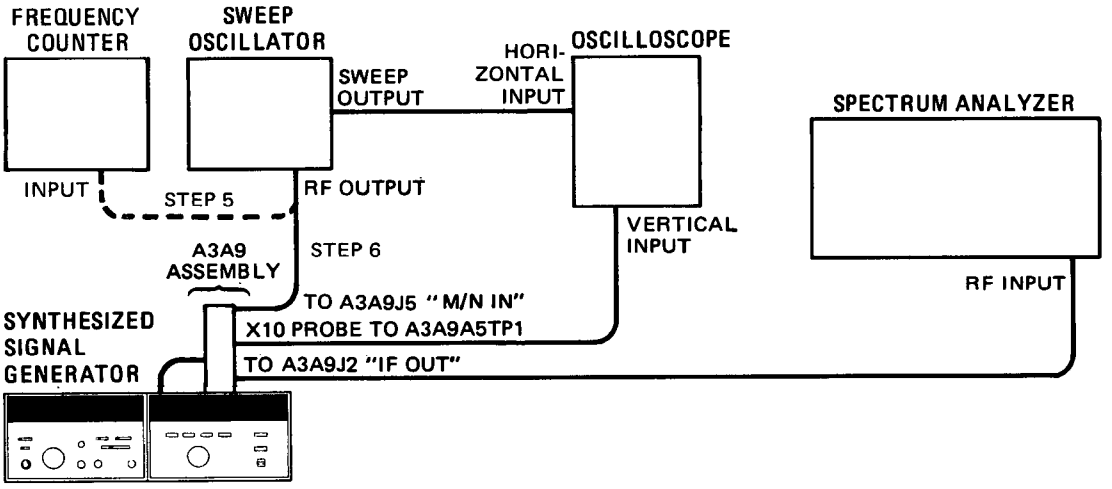


Figure 5-4. YTO Loop Sampler Adjustment Test Setup

EQUIPMENT:

Oscilloscope (with divide-by-10 probe) . .	HP 180C/1801A/1821A
Sweep Oscillator	HP 86220A/8620C
Spectrum Analyzer	HP 8553B/8552B/141T
Frequency Counter	HP 5340A

PROCEDURE:

1. Set the Synthesizer's RF switch to OFF and disconnect the power cord.
2. Remove the Synthesizer's top and bottom covers and place the A3A9 Assembly into the test position. See the disassembly procedures in Section VIII.
3. Remove the right side cover of A3A9.
4. Connect a 50 ohm termination to the A3A9A1 Directional Coupler.
5. Set the sweep oscillator's controls for a leveled output level of 0 dBm, center frequency range of 187.5 ± 1.0 MHz (measured by frequency counter) and a sweep range of 200 MHz ± 100 MHz.
6. Connect the equipment as shown in Figure 5-4. The sweep oscillator's RF output is connected to the M/N LOOP SIGNAL connector, A3A9J5, in place of the white-orange cable.
7. Adjust A3A9A5C1 and C2 (with an insulated adjustment tool) to get an oscilloscope display similar to Figure 5-5. Tune for maximum negative voltage and flatness over the center two divisions. The minimum change from the reference level to the maximum negative voltage should be 0.4 volts.

5-27. YTO Loop Sampler Adjustments (Cont'd)

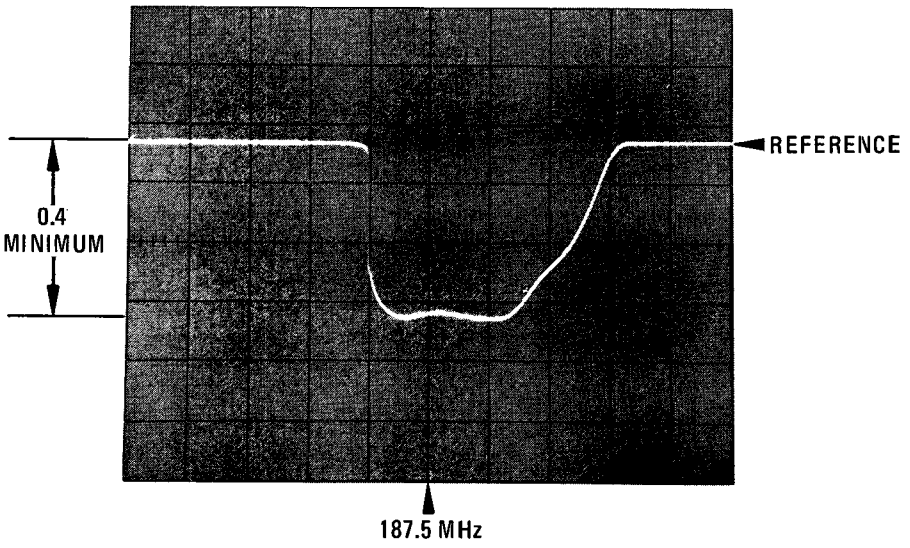


Figure 5-5. Typical Swept Frequency Response at A3A9A5TP1 (frequency span per division 20 MHz)

8. Short A3A7TP2 to ground. Set the Synthesizer's RF switch to ON and tune to 2100 MHz. Disconnect the grey cable from the phase detector output A3A9J6. Remove the oscilloscope's probe from A3A9A5TP1.

9. Connect the spectrum analyzer's input directly to the IF OUT A3A9J2.

10. Set the sweep oscillator's controls for a center frequency of 177.5 ±1.0 MHz; set the sweep width to 10 MHz.

11. Connect the sweep oscillator's output to the M/N LOOP SIGNAL input A3A9J5.

12. Set the spectrum analyzer's controls for a 0 to 100 MHz frequency span. Set the other controls to display the swept IF signal. The fundamental, second and third harmonics should be visible at 30, 60 and 90 MHz. Tune the sweep oscillator slightly to align the signals on the display.

13. Adjust the IF GAIN A3A9A5R1 so that the displayed IF signal at 30 MHz is +2 ± 1 dBm.

14. Slowly tune the sweep oscillator's center frequency from 174 to 181 MHz and observe the fundamental's output level. Verify that the allowable level variation is not exceeded or that the power does not drop below the stated level over the frequency range.

    a. From 20 to 30 MHz, +2 to +6 dBm.

    b. From 6 to 20 MHz, —3 dBm.

    c. From 30 to 70 MHz, —10 dBm.

5-27. YTO Loop Sampler Adjustments (Cont'd)

15. Return the Synthesizer to normal operation by:
    a. disconnecting the sweep generator;
    b. reconnecting the gray cable to A3A9J6 and the white-orange cable to A3A9J3;
    c. reversing the instructions of steps 4, 3, 2, and 1.
16. Verify that the frequency output is accurate to ± 1 kHz and that the phase lock circuits are locked before performing the Single-Sideband Phase Noise Ratio test.

5-28. YTO Loop Offset and FM Overmodulation Adjustments

REFERENCE: Service Sheet 9-A3.

DESCRIPTION: In order to operate the YTO loop phase-detector in the linear region, the loop offset must be set 1 radian from the detector's zero crossover point. A drive signal of 1 radian-peak is connected at the FM INPUT connector while the phase detector output is monitored with an oscilloscope. The loop offset adjustment is set so that foldover at the peak of the phase detector output signal just begins. To set the FM overmodulation threshold, the FM input level is set for a modulation index of 6.5. The adjustment is set to a position that just lights the front panel OVERMOD annunciator.

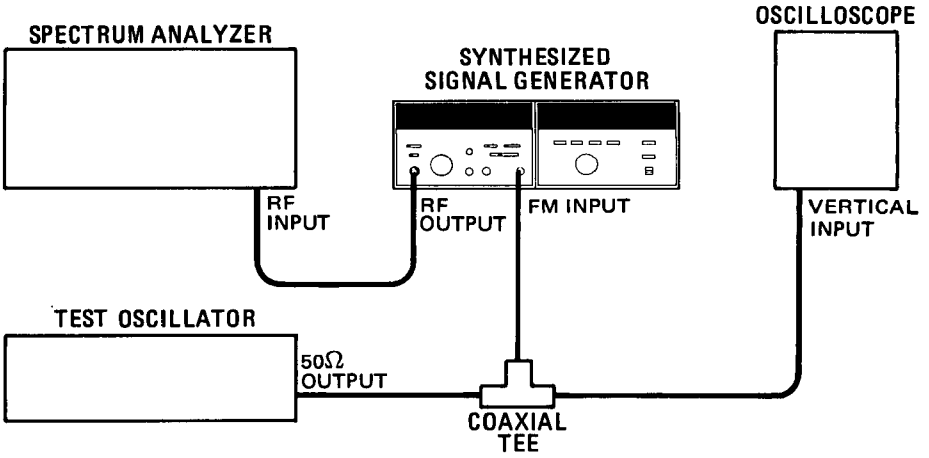


Figure 5-6. YTO Loop Offset and FM Overmodulation Test Setup

EQUIPMENT:

Oscilloscope	HP 180C/1801A/1821A
Spectrum Analyzer	HP 8565A
Test Oscillator	HP 651B

PROCEDURE:
1. Set the Synthesizer's FM Deviation switch to 10 MHz and press the PRESET (3 GHz) pushbutton.
2. Tune the test oscillator to 100 kHz.

5-28. YTO Loop Offset and FM Overmodulation Adjustments (Cont'd)

3. Connect the equipment as shown in Figure 5-6.

4. Adjust the spectrum analyzer's controls to display the carrier and the 100 kHz sidebands.

5. Adjust the test oscillator's output level for the first carrier null as observed on the spectrum analyzer's display. Record the test oscillator's output level as measured with the oscilloscope.

_____Vrms

6. Divide the measured value by 2.4. Readjust the test oscillator's output level to the computed level.

7. Connect the oscilloscope to A3A9A4TP1 through a divide-by-ten probe. Adjust the oscilloscope's controls to view the 100 kHz signal.

8. Set the YTO loop offset adjustment OFST A3A9A4R53 so the sinusoidal waveform just begins to fold over. Refer to Figure 5-7.

NOTE

There may be two settings of A3A9A4R53 which give the proper offset. Use the position closer to the center of the adjustment range.

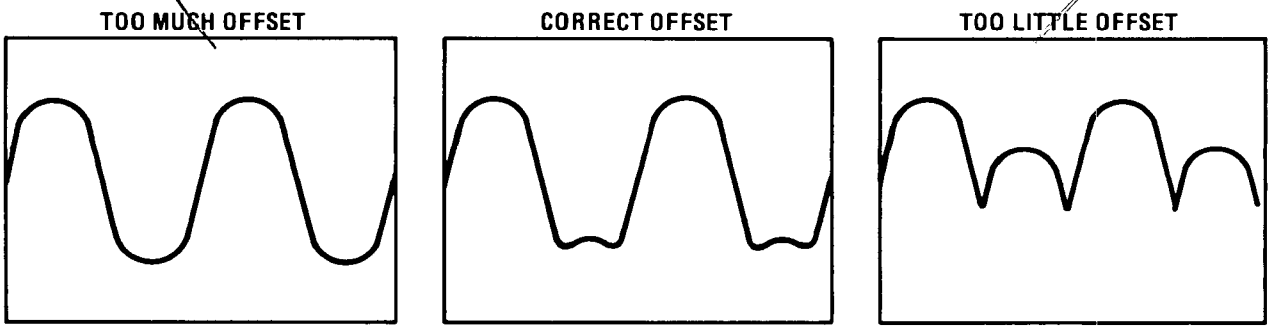


Figure 5-7. YTO Loop Offset Adjustment Waveforms

9. Disconnect the oscilloscope's probe.

10. Adjust the test oscillator's output level for the second carrier null as observed on the spectrum analyzer's display. Record the test oscillator's output level.

_____ Vrms

11. Multiply the measured value by 1.18. Readjust the test oscillator's output level to the computed level.

12. Set the FM overmodulation adjustment OMOD A3A9A4R30 to the full clockwise position. Slowly rotate the adjustment counterclockwise until the front panel OVERMOD annunciator is illuminated.

13. Verify that the output frequency is accurate to ±1 kHz and that the phase lock loop circuits are phase locked before performing the Single-Sideband Phase Noise Ratio test.

ADJUSTMENTS

5-29. YTO Loop Phase Detector Adjustment

REFERENCE: Service Sheet 9-A3.

DESCRIPTION: The gain-crossover frequency of the YTO Phase Locked loop is measured and adjusted using a low frequency spectrum analyzer and tracking generator.

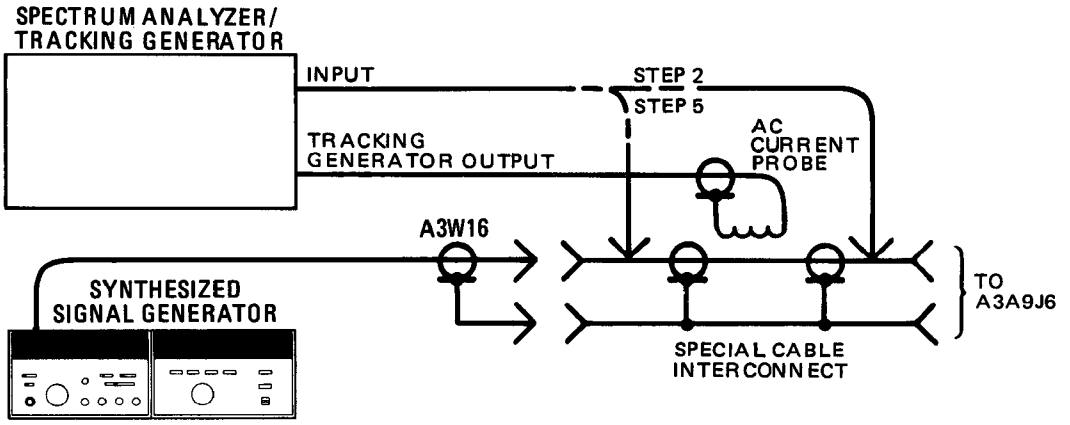


Figure 5-8. YTO Loop Phase Detector Adjustment Test Setup

EQUIPMENT:

Spectrum Analyzer (with tracking generator) . .	HP 8556A/8552B/141T
AC Current Probe	HP 1110B
Special Interconnect Cable	(See Figure 1-3).

PROCEDURE:

1. Set the Synthesizer RF switch to ON.
2. Connect the equipment as shown in Figure 5-8. The special interconnect cable is inserted between A3W16 (gray cable) and A3A9J6 (YTO Tune 1).

NOTE

When clipping the current probe around the special cable's center conductor, do not allow the metal surface to come in contact with the center conductor connection of the SMA connectors.

3. Set the spectrum analyzer to scan from 0 to 50 kHz, vertical sensitivity per division to 2 dB, scan mode to single, and set the display's variable persistence to maximum.
4. Press the single sweep pushbutton.
5. Move the spectrum analyzer's input to the cable side (A3W16) of the special cable.
6. Press the single sweep pushbutton. Check that the gain-crossover frequency is 20 ± 2 kHz. If the gain-crossover frequency is not correct, A3A9A4R20 must be changed to set the correct frequency. Refer to Figure 5-9.

5-29. YTO Loop Phase Detector Adjustment (Cont'd)

$$R_2 = R_1 \left(\frac{F_1}{F_2}\right)$$

where R_2 = required value for R20

R_1 = present value of R20

F_1 = measured frequency

F_2 = required frequency (20 kHz)

for example, if

$R_1 = 619\Omega$

and $F_1 = 25$ kHz

then $R_2 = 619 \frac{25\text{ kHz}}{20\text{ kHz}}$

$R_2 = 773\Omega$ or 750Ω (closest value)

7. Install R20 and recheck the gain-crossover frequency.

18 _____ 22 kHz

NOTE

The other loop parameters, phase margin and loop gain, may be checked if the loop does not operate correctly. Loop gain is checked at 1 kHz and should be approximately 40 dB. Phase margin is checked by disconnecting the input to the ac probe, shorting the input, and pressing the single sweep pushbutton. Phase margin should be approximately 45° and is calculated by the following expression:

$$\theta = \cos^{-1}\left[1 - \frac{10^{\left(\frac{A}{10}\right)}}{2}\right]$$

where θ = phase margin

and A = ratio (in dB) of the induced voltage to the gain-crossover. (Gain-crossover is the reference, therefore the ratio is negative.)

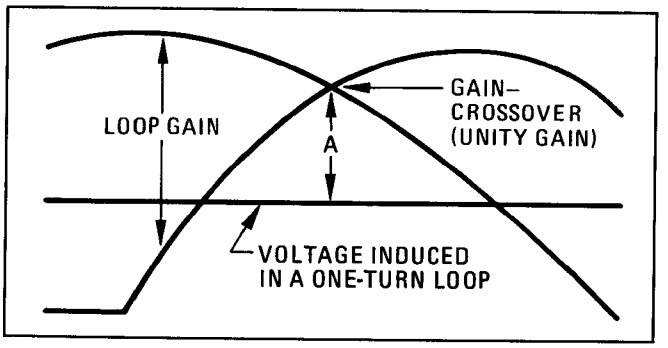


Figure 5-9. Spectrum Analyzer Display of Phase Locked-Loop Gain

ADJUSTMENTS

5-29. YTO Loop Phase Detector Adjustment (Cont'd)

8. Reinstall the A3A9 Assembly after replacing the covers. Refer to the appropriate procedures in Section VIII.

9. Verify that the output frequency is accurate to ±1 kHz and that the phase lock loop circuits are phase locked before performing the Single-Sideband Phase Noise Ratio test.

5-30. FM Driver Adjustment

REFERENCE: Service Sheet 10-A3.

DESCRIPTION: The dc offset of the FM integrator amplifier is set as close to zero volts as possible. Any FM signal present on the error signal line of the YTO phase-locked loop is nulled at both high and low FM driver sensitivity.

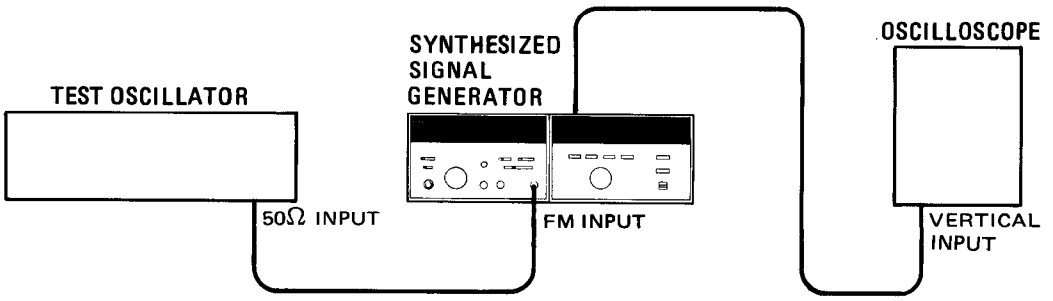


Figure 5-10. FM Driver Adjustment Test Setup

EQUIPMENT:

Oscilloscope	HP 180C/1801A/1821A
Test Oscillator	HP 651B

PROCEDURE:

1. Set the FM DEVIATION switch to 0.1 MHz.
2. Connect the oscilloscope to A3A7TP3.
3. Set OFST (offset adjust) A3A7R28 for 0.0 ± 0.1 Vdc.
4. Set the FM DEVIATION switch to 10 MHz.
5. Verify a voltage level of 0 ± 2 Vdc at A3A7TP3.
6. Set the RF switch to ON.
7. Set the test oscillator controls for an output of 1.5 mVrms at 5 kHz.
8. Connect the oscilloscope to A3A7TP2; connect the test oscillator output to the FM INPUT. The signal displayed by the oscilloscope will generally be less than 20 mV_{p-p}.
9. Set GAIN A3A7R40 to null any FM signal present at A3A7TP2.
10. Set FM DEVIATION MHz switch to 0.1 MHz and test oscillator output level to 0.15 Vrms.
11. Set −40 GN (−40 Gain) A3A7R46 to null any FM signal present at A3A7TP2.
12. Verify that the output frequency is accurate to ±1 kHz and that the phase locked loops are phase locked before performing the Single-Sideband Phase Noise Ratio test.

ADJUSTMENTS

5-31. A2 CONTROLLER ASSEMBLY ADJUSTMENTS

5-32. 160–240 MHz (20/30 MHz or LFS Loop) VCO Pretune Adjustments

REFERENCE: Service Sheet 3-A2.

DESCRIPTION: If any oscillator components have been replaced, the low and high frequency limits of the oscillator must be checked to insure proper operation. The oscillator coil is moved closer to or away from the circuit board in order to set the low and high frequency limits.

EQUIPMENT: Frequency Counter . . . . . HP 5340A

NOTE

This procedure need be performed only if major repair has been done to the oscillator.

PROCEDURE:

1. Set the LINE ON-STANDBY switch to STANDBY.
2. Remove the screws which hold the A2A3 VCO assembly in place.

WARNING

Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

3. Remove the A2A3 Assembly, place it on an extender board, and reinstall the assembly.
4. Remove the green cable A3W14 which is connected to the 20/30 MHz OUTPUT A2A3J1. Connect the frequency counter output to A2A3J1.
5. Set the LINE ON-STANDBY switch to ON.
6. Set A2A3S1 (FREQ TEST SWITCH) to the TEST HIGH FREQ position. The frequency should be greater than 30.5 MHz.
7. If the frequency is less than 30.4 MHz, the oscillator coil must be moved closer to the circuit board. The oscillator cover must be removed before adjusting the coil.

NOTE

The oscillator coil is normally mounted parallel to the circuit board with the bottom threads approximately 1.3 mm (0.050 inch) above the board.

8. Replace the oscillator cover and recheck the frequency.
9. Set A2A3S1 to the TEST LOW FREQ position. Verify a frequency reading of less than 19.5 MHz. If necessary, remove the cover, reset the coil, replace the cover and repeat steps 6 through 9.
10. Set A2A3S1 to the NORMAL position.
11. Reinstall A2A3 in its cavity and reconnect the green cable to A2A3J1.

ADJUSTMENTS

5-33. 20/30 MHz (LFS) Loop Divider Bias Adjustments

REFERENCE: Service Sheet 1-A2.

DESCRIPTION: A clock signal derived from an external RF signal source is monitored with an oscilloscope. The RF signal level is slowly reduced and the CLK BIAS ADJ is set to obtain a stable clock signal. The RF input is reduced to the minimum level that provides a stable signal.

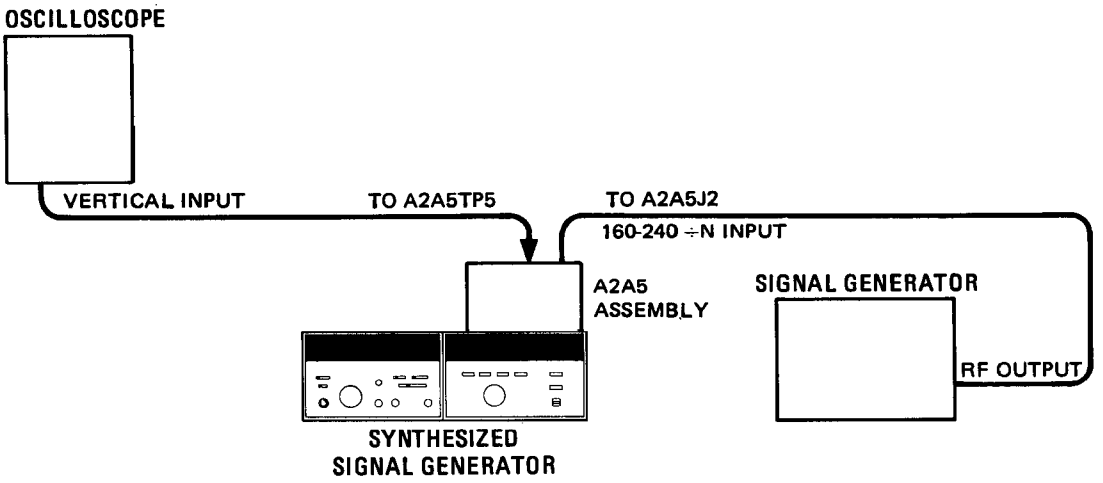


Figure 5-11. 20/30 MHz Loop Divider Bias Adjustment Test Setup

EQUIPMENT:
Oscilloscope . . . . . HP 180C/1801A/1821A
Signal Generator . . . . . HP 8654A

PROCEDURE:

1. Disconnect the Mains power cable and set the LINE ON-STANDBY switch to STANDBY.
2. Remove the screws that hold the A2A5 20/30 MHz Divider Assembly in place.

WARNING

Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

3. Remove the A2A5 Assembly, place it on an extender board, and reinstall the assembly.
4. Connect the power cable to the power module. Set the LINE ON-STANDBY switch to ON.
5. Set the signal generator controls for cw output of —5 dBm at 240 MHz.
6. Remove the red cable A2W2 from the 160—240 MHz INPUT A2A5J1.

ADJUSTMENTS

5-33. 20/30 MHz (LFS) Loop Divider Bias Adjustments (Cont'd)

7. Connect the equipment as shown in Figure 5-11.
8. Center A2A5R4 (CLK BIAS ADJ).
9. Observe the clock signal on the oscilloscope display.
10. Adjust A2A5R4 to obtain a stable clock frequency.
11. Reduce the signal generator output level while readjusting A2A5R4 to obtain a stable clock signal at the lowest possible signal.
12. Verify that a stable clock signal is obtained with an input signal of −10 dBm or less.
13. Disconnect the test equipment and reinstall A2A5 in its cavity. Reconnect the cable to A2A5J1.

5-34. A2A4 Assembly Notch Filter Adjustment

REFERENCE: Service Sheet 2-A2.

DESCRIPTION: A 7985 Hz signal is passed through the 8 kHz notch filter. The adjustable components are set for the minimum signal transfer.

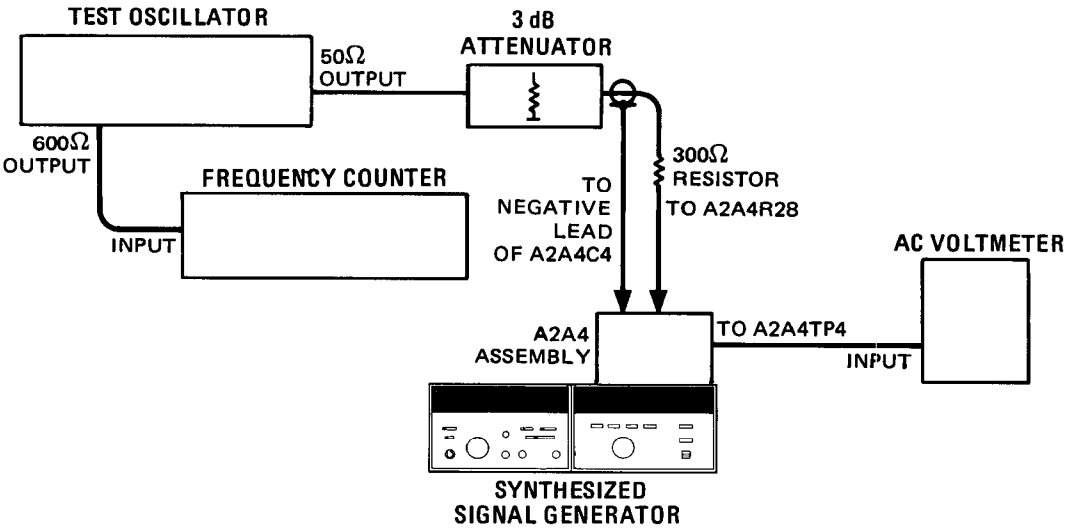


Figure 5-12. A2A4 Assembly Notch Filter Adjustment Test Setup

EQUIPMENT:

Test Oscillator	HP 651B
Frequency Counter	HP 5340A
AC Voltmeter	HP 400E
3 dB Attenuator	HP 8491A Option 003

5-34. A2A4 Assembly Notch Filter Adjustment (Cont'd)

PROCEDURE:

1. Set the LINE ON-STANDBY switch to STANDBY.

WARNING

Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

2. Remove the A2A4 Assembly.
3. Unsolder the input end (top) of A2A4R28 (refer to the component location diagram).
4. Install the circuit board on an extender board.
5. Connect the equipment as shown in Figure 5-12. The leads from the 3 dB attenuator should be as short as possible. Clip the ground wire to the negative side of A2A4C4.
6. Set the test oscillator's controls for 1 kHz and an AC voltmeter indication of +10 dBm.
7. Set the test oscillator as close to 7985 Hz as possible.
8. Adjust A2A4L3 and L4 to minimize the meter reading. The indication must be less than −50 dBm.
9. Resolder A2A4R28, reinstall the A2A4 Assembly, and replace the top cover.

NOTE

If required, proceed to the YTO Loop Sampler Adjustments.

5-35. A1 RF OUTPUT ASSEMBLY ADJUSTMENTS

5-36. YTM Adjustments

REFERENCE: Service Sheet 2-A1 and 3-A1.

DESCRIPTION: The injected input from the test oscillator causes the YTM to sweep across a band that is centered at the Synthesizer's RF output frequency. The RF output is detected and the swept response is viewed on the oscilloscope's display. The adjustments align the YTM tuning with respect to the RF output. Final adjustments set the power output level.

5-36. YTM Adjustments (Cont'd)

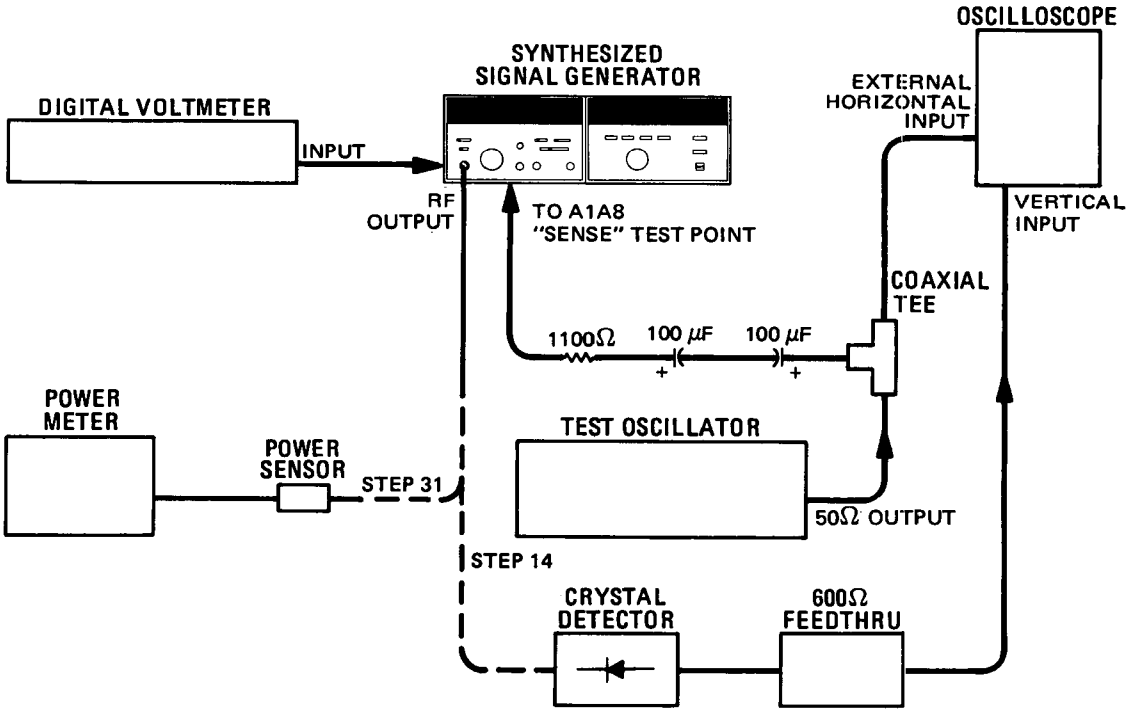


Figure 5-13. YTM Adjustments Test Setup

EQUIPMENT:

Oscilloscope	HP 180C/1801A/1821A
Test Oscillator	HP 651B
Crystal Detector	HP 8470B Option 012
600Ω Feedthru Termination	HP 11095A
Power Meter/Sensor	HP 436A/8481A
Digital Voltmeter	HP 3455A

PROCEDURE:

1. Set the LINE switch to STANDBY.

2. Adjust the front panel meter's mechanical zero adjustment for a meter indication of exactly zero (0).

3. Remove the Synthesizer's top cover and the A1 Assembly's cover by following the disassembly instructions found in Section VIII.

4. Set the Synthesizer's controls as follows:

LINE switch	ON
METER MODE Switch	LEVEL
RF Switch	ON
ALC Mode Switch	PWR MTR
OUTPUT LEVEL RANGE Switch	0 dBm
AM Function Switch	OFF

5-36. YTM Adjustments (Cont'd)

FM DEVIATION Switch . . . . . OFF
PRESET (3 GHz) pushbutton . . . . . press
RF OUTPUT PEAK-NORM Control . . . . . NORM

5. Allow 30 minutes warmup.

6. Connect the "HIGH" input lead of the DVM to the +12.4V test point on A1A8; connect the "LOW" input lead to the GND test point on A1A8.

7. Adjust +12.4V A1A8R64 for +12.400 ± 0.005 Vdc.

NOTE

The following two steps need be done only after replacing the A1A3 YTM Assembly.

8. Connect the "HIGH" input lead of the DVM to +C.S. test point on the A1A8 Assembly. (The "LOW" input lead remains as is.)

9. Adjust BD1 LO A1A8R46 for +8.0 ± 0.2 Vdc.

10. Tune to 2000 MHz.

11. Center BIAS adjust A1A7R31 and PWR adjust A1A7R29.

12. Set the test oscillator's controls for an output of 60 Hz at 700 mVrms (open circuit).

13. Set the oscilloscope's vertical controls to 0.1 volt per division with dc coupling; set the horizontal controls for external sweep with the magnifier to X10.

14. Connect the equipment as shown in Figure 5-13.

15. Adjust the oscilloscope's horizontal sensitivity to obtain a 6 division sweep that is centered horizontally. Set polarity to —UP.

16. Set BD1 LO A1A8R46 to center the YTM response as shown in Figure 5-14A.

17. Tune to 6000 MHz; adjust BD1 HI A1A8R20 to center the YTM response.

18. Tune from 6000 to 2000 MHz. Verify that the YTM response remains reasonably well centered across the band.

19. Tune to 6500 MHz; adjust BD2 LO A1A8R41 to set the peak of the YTM response about 1 division to the right of center. Refer to Figure 5-14B.

20. Tune to 11 500 MHz; adjust BD2 HI A1A8R16 to set the response as shown in Figure 5-14B.

5-36. YTM Adjustments (Cont'd)

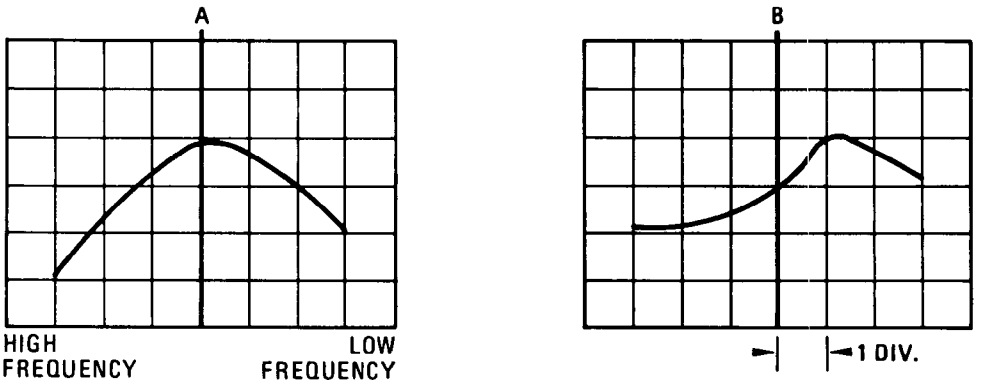


Figure 5-14. Typical YTM Response

21. Tune from 12 300 to 6200 MHz. Verify that the peak YTM response stays to the right of center (at times may be very nearly centered) across the entire range.

NOTE

If necessary, iterate the BD2 LO and BD2 HI adjustments to keep the peak response to the right of center (especially important above 9000 MHz).

22. Tune to 13 000 MHz; adjust BD3 LO A1A8R47 to set the YTM response peak 0.4 divisions to the right of center.

23. Tune to 16 000 MHz; adjust BD3-16 A1A8R11 to set the YTM response peak 0.4 divisions to the right of center.

23A. Tune to 18000 MHz and wait 10 minutes for the YTM to stabilize.

24. Tune to 17 000 MHz; adjust BD3-17 A1A8R17 to center the response.

25. Tune to 18 000 MHz; adjust BD3-18 A1A8R23 to center the response.

26. Tune to 18 599 MHz; adjust BD3-18.6 A1A8R32 to center the response.

27. Tune from 12.4 GHz to 16 GHz to assure the response peak remains to the right of center. If necessary, iterate BD3 LO and BD3-16 to obtain the required response. End iteration with BD3-16.

28. Tune from 16 000 to 18 000 MHz to assure the response peak remains approximately centered across the band. If not iterate between BD3-16, BD3-17, and BD3-18 to obtain the required response. The last adjustment should be made on BD3-18.

5-36. YTM Adjustments (Cont'd)

29. Tune from 18 000 to 18 599 MHz to assure the response peak remains approximately centered. Iterate BD3-18 and BD3-18.6 if necessary to obtain the required response. The last adjustment should be made to the BD3-18.6 adjustment.

30. Remove the signal from the A1A8 SENSE test point.

31. Connect the power sensor to the RF OUTPUT connector; tune to 11 500 MHz.

32. Adjust PWR A1A7R29 to obtain the maximum output power. Readjust A1A7R29 to reduce the power output 0.5 dB.

33. Set the Synthesizer's ALC mode switch to INT; set the OUTPUT LEVEL RANGE switch to 0 dBm.

34. Set the OUTPUT LEVEL VERNIER control for a −10 dBm reading on the power meter.

35. Connect the DVM to A1A5TP6; adjust BIAS A1A7R31 to obtain the maximum DVM reading.

36. The voltage at the A1A7 BIAS test point should be −0.45 ±0.1 Vdc.

5-37. ALC Adjustments

REFERENCE: Service Sheets 1-A1, 3-A1, 4-A1 and 5-A1.

DESCRIPTION: Various adjustments are made while monitoring the output power level. First, the AM balance is set by adjusting the AM BAL for the same power level in and out of the AM mode. The front panel meter is calibrated in the RF level mode. The overrange adjustment is set to obtain the same RF level in and out of the overrange mode. The programmed tracking of RF output level (1 dB steps) is set. The maximum flatness of high frequency bands is adjusted relative to a band 1 reference.

EQUIPMENT:

Digital Voltmeter	HP 3455A
Power Meter/Sensor	HP 436A/8481A
HP-IB Controller	HP 9830A or HP 9825A with HP 11712A.
HP-IB Interconnect Cable	HP 10833A

PROCEDURE:

1. Set the LINE switch to STANDBY; set the front panel meter's mechanical zero adjustment for a meter indication of exactly zero (0).

2. Set the ALC mode switch to INT and set the front panel RF OUTPUT PEAK control to NORM.

3. Preset the following adjustable components as follows:

MET CAL	A1A5R69,	center
Slope 10 GHz	A1A7R18,	full ccw
Slope 18 GHz	A1A7R4,	center

ADJUSTMENTS

5-37. ALC Adjustments (Cont'd)

4. Tune to 4000 MHz and set the OUTPUT LEVEL RANGE switch to 0 dBm. Set the VERNIER control for a meter reading of −4 dBm.

5. Connect the DVM to A1A5TP4 (positive lead) and A1A5 GND test points.

6. Adjust OS (offset) A1A5R3 to obtain +130.0 ±0.5 mVdc. The ALC loop must be leveled (LEV UNCAL lamp off).

7. Connect the power meter to the RF OUTPUT connector.

8. Adjust the OUTPUT LEVEL VERNIER control for a power meter reading of 0 dBm.

9. Set the AM switch to OFF. Measure and record the output power level.

_____ dBm

10. Set the AM switch to 30%. Adjust AM BAL A1A5R54 for the same output power as measured in step 9.

11. Set the AM switch to OFF.

12. Connect the HP-IB controller to the Synthesizer.

13. Load and run the following program. Thirty-two seconds is allowed for each adjustment. When the adjustment is complete, press any alphanumeric key to advance to the next step. Some adjustments are iterative. The program will continue to loop until told to do otherwise.

NOTE

The following program is intended for use with the HP 9830A Calculator. For use with any other HP-IB controller the program may need to be modified.

```
10 DIM A$[20]
20 CMD "?U3","A4000000Z10=070"
30 PRINT "CONNECT THE DVM TO A1A6TP5 ('HIGH' INPUT LEAD) AND"
40 PRINT "    A1A6 GND 1 ('LOW' INPUT LEAD)."
50 PRINT "ADJ 'INT OS' A1A6R12 FOR 0 +-10 MICROVOLTS DC."
60 DISP "REFER TO THE PRINTOUT"
70 WAIT 32000
80 CMD "?U3","K0=071"
90 PRINT "ADJUST  -GAIN- A1A10R31 FOR -10 DB ON PANEL METER."
100 WAIT 32000
110 CMD "?U3","K03"
120 PRINT "ADJ. -MET CAL- A1A5R69 FOR 0 DB ON PANEL METER."
130 WAIT 32000
140 PRINT "IS LESS THAN 0.1 DB IMPROVEMENT MADE"
150 PRINT "    WITH EACH ADJUSTMENT."
```

ADJUSTMENTS

5-37. ALC Adjustments (Cont'd)

```
160 INPUT A$
170 IF A$="Y" THEN 220
180 IF A$="YES" THEN 220
190 IF A$="1" THEN 220
200 GOTO 80
210 STOP
220 PRINT "THIS PROGRAM WILL LOOP UNTIL YOU ARE SATISFIED"
230 PRINT "   WITH THE ADJUSTMENTS."
240 PRINT "THE CALCULATOR WILL WAIT UP TO 32 SECONDS"
250 PRINT "   FOR EACH ADJUSTMENT."LIN1
260 PRINT "IF YOU FINISH BEFORE THE TIME IS UP, PRESS"
270 PRINT "   ANY ALPHANUMERIC KEY."LIN1
280 PRINT "TO TERMINATE PROGRAM, USE THE STOP KEY."LIN1
290 CMD "?U3","K03071"
300 PRINT "THE REMAINING ADJUSTMENTS ARE MADE"
310 PRINT "   USING THE POWER METER."LIN1
320 DISP "RECORD THE POWER METER READINGS."
330 WAIT 32000
340 CMD "?U3","K0=073"
350 PRINT "ADJ -OVERRANGE- A1A6R36 FOR THE SAME POWER."LIN1
360 WAIT 32000
370 PRINT "REPEAT THE '-3 DBM', '+8 DBM', AND '-10 DBM'"
380 PRINT "   ADJUSTMENTS UNTIL LESS THAN 0.01 DB"
390 PRINT "   IMPROVEMENT IS MADE WITH EACH READJUSTEMENT."
400 CMD "?U3","L601"
410 PRINT "ADJ '-3' A1A6R33 FOR -3 DBM."
420 WAIT 32000
430 CMD "?U3","L503"
440 PRINT "ADJ '+8' A1A6R28 FOR +8 DBM."
450 WAIT 32000
460 CMD "?U3","L601"
470 PRINT "ADJ '-3' A1A6R33 FOR -3 DBM."
480 WAIT 32000
490 CMD "?U3","L="
500 PRINT "ADJ '-10' A1A6R39 FOR -10 DBM."LIN1
510 WAIT 32000
520 PRINT "IS LESS THAN 0.01 DB IMPROVEMENT MADE"
530 PRINT "   WITH EACH READJUSTMENT?"
540 INPUT A$
550 IF A$="Y" THEN 590
560 IF A$="YES" THEN 590
570 IF A$="1" THEN 590
580 GOTO 400
590 OUTPUT (13,600)256,1,512;
600 FORMAT 3B
610 PRINT "CONTINUE WITH STEP 14."
620 END
```

ADJUSTMENTS

5-37. ALC Adjustments (Cont'd)

14. Set the OUTPUT LEVEL RANGE switch to 0 dBm; Adjust the OUTPUT RANGE VERNIER to exactly 0 dBm. Record the power meter reading.

_____ dBm.

15. Tune the Synthesizer to 10 000 MHz and adjust Slope 10 GHz A1A7R18 for the same power reading recorded in step 14.

16. Tune to 18 000 MHz and adjust Slope 18 GHz A1A7R4 for the same power reading recorded in step 14.

17. Tune between 8000 and 12 000 MHz (1 MHz tuning resolution).

18. Adjust Slope 10 GHz A1A7R18 to make the power variation symmetrical about 0 dBm.

19. Tune between 17 000 and 18 000 MHz and adjust Slope 18 GHz A1A7R4 to make the variation symmetrical about 0 dBm.

20. Tune from 2000 to 18 000 MHz to ensure flatness is within specification. Reset the power meter's calibration factor switch as needed.

5-38. External Leveling Adjustments

REFERENCE: Service Sheet 4-A1.

DESCRIPTION: These adjustments are made to minimize dc offset and to center the operating range of the external leveling circuitry.

EQUIPMENT:

Digital Voltmeter	HP 3455A
Power Meter/Sensor	HP 436A/8481A
50 Ohm Termination	HP 11593A
HP-IB Controller	HP 9830A or HP 9825A with HP 11712A.

PROCEDURE:

1. Tune to 4000 MHz.
2. Center the EXT ALC INPUT CAL control.
3. Place a 50 ohm BNC termination on the EXT ALC INPUT connector.
4. Connect the DVM to A1A6TP6 and A1A6 GND2.
5. Adjust EXT OS (external offset) A1A6R13 for 0.0 ±0.1 mVdc.
6. Disconnect the DVM and 50 ohm termination.
7. Connect the power sensor to the RF OUTPUT connector; connect the power meter's recorder output to the EXT ALC INPUT.

NOTE

Because the HP 436A has automatic ranging, this procedure will work properly only when the range hold switch is activated on the 0 dBm range.

ADJUSTMENTS

5-38. External Leveling Adjustments (Cont'd)

8. Set the power meter to the 0 dBm range.

9. Connect the HP-IB controller to the Synthesizer.

10. Load and run the following program. Thirty seconds is allowed for each adjustment. When the adjustment is complete, press any alphanumeric key to advance to the next step.

NOTE

This program is intended for use with the HP 9830A calculator. For use with any other HP-IB controller, the program must be modified.

```
10 OUTPUT (13,20)1280,768;
20 FORMAT 2B
30 PRINT "MONITOR OUTPUT POWER WITH POWER METER"
40 PRINT "   WHILE MAKING ADJUSTMENTS."
50 DISP "REFER TO PRINTOUT."
60 WAIT 5000
70 CMD "?U3","K0=07@".
80 DIM A$[20]
90 PRINT "ADJ THE FRONT PANEL 'EXT ALC INPUT CAL' CONTROL"
100 PRINT "   FOR -10 +-0.1 DBM."
110 WAIT 30000
120 CMD "?U3","L3"
130 PRINT "ADJ 'EXT GAIN'A1A6R38 FOR 0.0 +-0.1 DBM."
140 WAIT 30000
150 PRINT "IS +-0.1 TOLERANCE ACHIEVED FOR BOTH ADJUSTMENTS?"
160 PRINT "   YES OR NO"
170 INPUT A$
180 IF A$="YES" THEN 200
190 GOTO 70
200 FORMAT 3B
210 OUTPUT (13,20)256,1,512;
220 PRINT "ADJUSTMENT COMPLETED."
230 END
```

ADJUSTMENTS

5-39. AM Bandwidth Adjustment

REFERENCE: Service Sheet 1-A1.

DESCRIPTION: The bandwidth of the AM circuit is set. A reference level is established on the spectrum analyzer display. The maximum specified AM drive frequency is set for each frequency band. The center frequency is tuned across the band to determine worst case sensitivity. The AM gain adjustment is set to a predetermined level for each band.

EQUIPMENT:

Spectrum Analyzer	HP 8553B/8552B/141T
Test Oscillator	HP 651B

PROCEDURE:

1. Set the Synthesizer's controls for an output of —110 dBm (—110 dBm range; 0 dBm meter reading) at 2000 MHz. Set the AM function switch to 100%.
2. Set the test oscillator controls for an output of 0.5 Vrms at 10 kHz.
3. Connect the spectrum analyzer's input to A1A6TP3; connect the test oscillator's 600Ω output to the AM INPUT connector.
4. Set the spectrum analyzer controls to view the 10 kHz signal.

NOTE

Do not be concerned about the high harmonic content observed on the spectrum analyzer display.

5. To establish a reference level for the modulation signal, set the peak of the 10 kHz signal to the center horizontal graticule line using the vertical sensitivity range and vernier controls (2 dB log per division). DO NOT disturb the vertical sensitivity controls or test oscillator amplitude controls for the remainder of this test.
6. Tune the test oscillator to 200 kHz.
7. Tune the spectrum analyzer to display the 200 kHz signal.
8. Tune the Synthesizer from 2000 to 6199 MHz in 1 MHz steps to find the frequency that yields the highest level (AM sensitivity). Note the frequency and level.
9. Set the VERNIER control for a meter reading of 10 dBm. Tune from 2000 to 6199 MHz in 1 MHz steps. Note the frequency and level of the lowest level (AM sensitivity).
10. Tune to the frequency of highest AM sensitivity as determined in steps 8 and 9.
11. Set GAIN X1 A1A5R23 for a displayed signal equal to the reference graticule.
12. Tune the Synthesizer from 6200 to 12 399 MHz in 1 MHz steps to find the frequency of highest modulation sensitivity.

5-39. AM Bandwidth Adjustment (Cont'd)

13. Set GAIN X2 A1A5R20 for a displayed signal equal to the reference graticule.

14. Tune the synthesizer from 12 4000 to 18 000 MHz (1 MHz steps) to find the frequency of highest modulation sensitivity.

15. Set GAIN X3 A1A5R14 for a displayed signal amplitude equal to the reference graticule.

5-40. AM Meter Adjustment

REFERENCE: Service Sheet 8-A1.

DESCRIPTION: The Unit Under Test RF output is mixed with the output of the reference unit. The 10 MHz IF signal is connected to the oscilloscope's vertical input. The test oscillator's output is used to drive the AM circuits in the Unit Under Test and the horizontal amplifiers in the oscilloscope. The resultant oscilloscope display is a trapezoidal waveform from which AM depth is easily calculated.

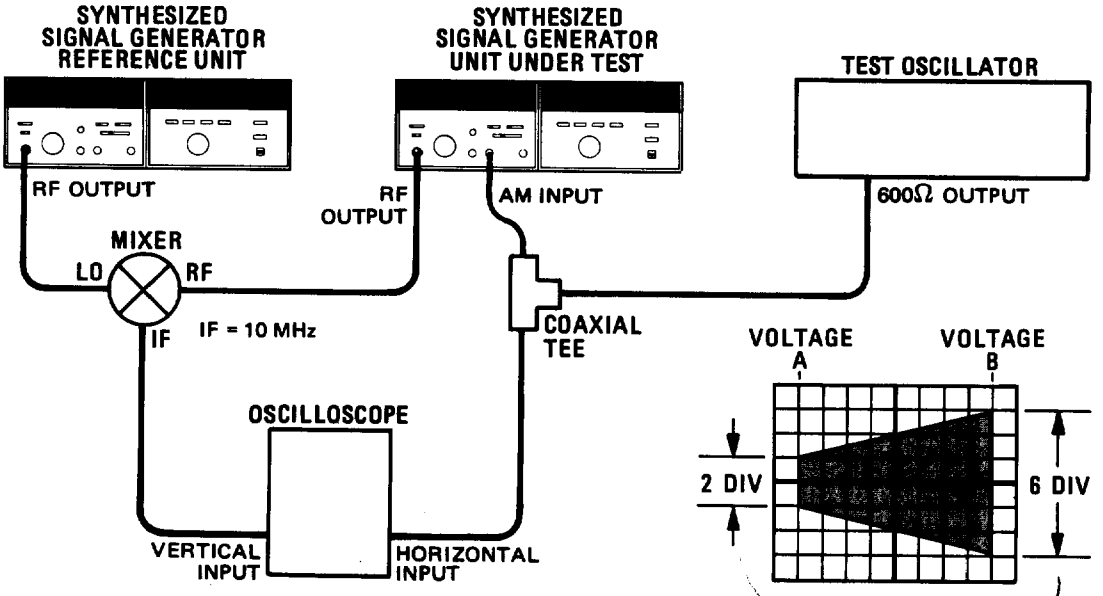


Figure 5-15. AM Meter Adjustment Test Setup

EQUIPMENT:

Synthesized Signal Generator . . .	HP 8672A
Mixer	RHG DM1-18
Test Oscillator	HP 651B
Oscilloscope	HP 180C/1801A/1821A

5-40. AM Meter Adjustment (Cont'd)

PROCEDURE:

1. Set the test oscillator's controls to 10 kHz at 0.35 Vrms.
2. Set the controls of the Unit Under test in the following order:

METER MODE switch	LEVEL
RF Switch	ON
OUTPUT LEVEL RANGE switch	−20 dBm
OUTPUT LEVEL VERNIER control for meter reading of	0 dB
ALC mode switch	INT
AM function switch	100%
FM DEVIATION switch	OFF
PRESET (3 GHz)	press
METER MODE switch	AM

3. Set the controls of the reference unit for an output of +8 dBm (or maximum leveled output) at 3010 MHz.
4. Set the oscilloscope's controls to display the trapezoidal modulation signal as shown in Figure 5-15.
5. Adjust the test oscillator's output voltage so that voltage A is 2 divisions and voltage B is 6 divisions.
6. Adjust AM MTR A1A9R69 to obtain a front panel meter reading of 50% AM depth.

5-41. AM Meter Adjustment — Alternate Procedure

REFERENCE: Service Sheet 8-A1.

DESCRIPTION: The Synthesizer's amplitude modulated output is input to a spectrum analyzer. The meter drive circuit is set to read the same AM depth as indicated on the analyzer's display.

EQUIPMENT:

Spectrum Analyzer	HP 8565A
Test Oscillator	HP 651B

PROCEDURE:

1. Set the test oscillator's controls to 10 kHz and 0.35 Vrms.
2. Set the Synthesizer's controls in order as follows:

METER MODE switch	LEVEL
RF switch	ON
OUTPUT LEVEL RANGE switch	0 dBm
OUTPUT LEVEL VERNIER control for meter reading of	0 dB
ALC mode switch	INT
AM function switch	100%
FM DEVIATION switch	OFF
PRESET (3 GHz)	press
METER mode switch	AM

ADJUSTMENTS

5-41. AM Meter Adjustment – Alternate Procedure (Cont'd)

3. Connect the spectrum analyzer's RF input to the Synthesizer's RF OUTPUT; connect the test oscillator's 600 ohm output to the Synthesizer's AM INPUT.

4. Adjust the spectrum analyzer's controls to view the carrier and AM sidebands on the display. Set the frequency span per division to 10 kHz; vertical sensitivity per division 2 dB.

5. Adjust the test oscillator output voltage to obtain AM sidebands that are 12 dB down from carrier. Ignore the distortion sidebands.

6. Adjust AM MTR A1A9R69 to obtain a front panel meter reading of 50% AM depth.

5-42. FM Adjustments

REFERENCE: Service Sheet 8-A1.

DESCRIPTION: The RF signal is viewed on the spectrum analyzer's display. With a preset modulation drive input, the FM gain is set for modulation index of 2.40 (first carrier null). The modulation drive is set for a level which will cause FM deviation equal to a full scale meter reading. The meter drive adjustment is set accordingly. The modulation drive is set to a level which will cause overmodulation and the FM overmodulation control is set to cause the OVERMOD annunciator to be illuminated.

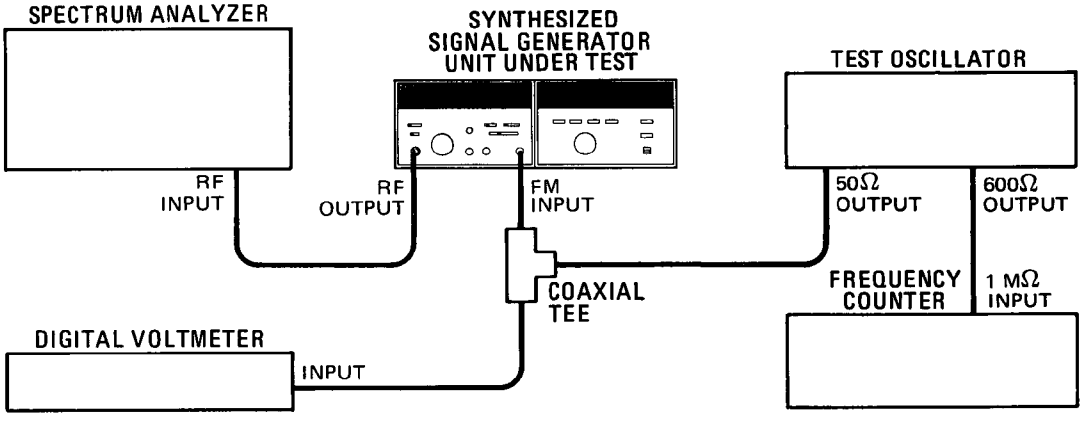


Figure 5-16. FM Adjustments Test Setup

ADJUSTMENTS

5-42. FM Adjustments (Cont'd)

EQUIPMENT:

Spectrum Analyzer	HP 8565A
Test Oscillator	HP 651B
Frequency Counter	HP 5340A
Digital Voltmeter	HP 3455A

PROCEDURE:

1. Set the controls of the unit under test in order as follows:

METER MODE switch	LEVEL
RF switch	ON
ALC mode switch	INT
OUTPUT LEVEL RANGE switch	−20 dBm
OUTPUT LEVEL VERNIER control for a meter reading of	0 dB
AM function switch	OFF
FM DEVIATION switch	0.3 MHz
PRESET (3 GHz)	press PRESET

2. Set METER MODE switch to FM.
3. Connect the equipment as shown in Figure 5-16.
4. Set the test oscillator's controls to 100 kHz at 0.5668 Vrms.
5. Set FM OMOD A1A9R34 to its full clockwise position.
6. Set the spectrum analyzer's controls as follows: center frequency 3000 MHz, frequency span per division 100 kHz and resolution bandwidth 10 kHz. Other controls are adjusted to provide a good display of the signal.
7. Adjust FM GAIN A1A9R37 for the first carrier null.

NOTE

If it is impossible to adjust the FM GAIN for the first carrier null refer to Table 5-1. Check the values of selected components A3A7R61, 75 and 65.

8. Set the test oscillator's output level to 0.707 Vrms.
9. Adjust FM MTR A1A9R21 for a full scale front panel meter reading on the Unit Under Test.
10. Set the test oscillator's output to 100.00 ± 0.05 kHz and 0.7425 Vrms.
11. Slowly adjust FM OMOD A1A9R34 until the front panel OVERMOD annunciator is illuminated.
12. Reduce the test oscillator's output to 0.707 Vrms; verify that the OVERMOD annunciator is off.

SECTION VI
REPLACEABLE PARTS

6-1. INTRODUCTION

This section contains information for ordering parts. Table 6-2 lists abbreviations used in the parts list and throughout the manual. Table 6-3 lists all replaceable parts in reference designator order. Table 6-4 contains the names and addresses that correspond to the manufacturer's code numbers.

6-2. EXCHANGE ASSEMBLIES

Table 6-1 lists assemblies that may be replaced on an exchange basis, thus affording a considerable cost saving. Exchange, factory-repaired, and tested assemblies are available only on a trade-in basis; therefore, the defective assembly must be returned for credit. For this reason, assemblies required for spare parts stock must be ordered by the new part assembly number.

6-3. ABBREVIATIONS

Table 6-2 lists abbreviations used in the parts list, schematics, and throughout the manual. In some cases, two forms of the abbreviation are used, one all in capitals letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower case and upper case letters.

6-4. REPLACEABLE PARTS LIST

Table 6-3 is the list of replaceable parts and is organized as follows:

a. Electrical assemblies and their components in alphanumeric order by reference designation.

b. Chassis-mounted parts in alphanumeric order by reference designation.

c. Mechanical parts.

The information given for each part consists of the following:

a. The Hewlett-Packard part number.

b. Part number check digit (CD).

c. The total quantity (Qty) used in the major assembly (A1, A2 or A3).

d. The description of the part.

e. A typical manufacturer of the part in a five-digit code.

f. The manufacturer's number for the part.

The total quantity for each part is given only once — at the first appearance of the part number in the list for each major assembly.

NOTE

Total quantities for optional assemblies are totaled by assembly and not integrated into the standard list.

6-5. PARTS LIST UPDATING (Change Sheet)

Production changes to Signal Generators made after the publication date of this manual are accompanied by a change in the serial number prefix. Changes to the parts list are recorded by serial number prefix on a MANUAL CHANGES supplement. Also, parts list errors are noted in the ERRATA portion of the MANUAL CHANGES supplement.

6-6. ILLUSTRATED PARTS BREAKDOWN

Most mechanical parts are identified in Figures 6-1 and 6-2.

6-7. ORDERING INFORMATION

To order a part listed in the replaceable parts table, include the Hewlett-Packard part number (with the check digit), and the quantity required. Address the order to the nearest Hewlett-Packard office. The check digit will ensure accurate and timely processing of your order.

To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, description and function of the part, and the number of parts required.

ORDERING INFORMATION (cont'd)

Address the order to the nearest Hewlett-Packard office.

NOTE

Within the USA, it is better to order directly from the HP Parts Center in Mountain View, California. Ask your nearest HP office for information and forms for the "Direct Mail Order System".

6-8. RECOMMENDED SPARES LIST

Stocking spare parts for an instrument is often done to ensure quick return to service after a malfunction occurs. Hewlett-Packard prepares a "Recommended Spares" list for this instrument. The contents of the list are based on failure reports and repair data. Quantities given are for one year of parts support. A complimentary copy of the "Recommended Spares" list may be requested from your nearest Hewlett-Packard office.

When stocking parts to support more than one Signal Generator or to support a variety of Hewlett-Packard instruments, it may be more economical to work from one consolidated list rather than simply adding together stocking quantities from the individual instrument lists. Hewlett-Packard will prepare consolidated "Recommended Spares" lists for any number or combination of instruments. Contact your nearest Hewlett-Packard office for details.

Table 6-1. Part Numbers for Restored Assemblies

Reference Designation	Description	Part Number[1]	
		Exchange Assembly	New Assembly
A1A3	YTM Assembly	5086-6151	5086-7151
A1AT1	Programmable Attenuator Assembly	08672-60111	08672-60114
A3A1A4	M/N VCO Assembly	86701-60071	86701-60065
A3A9A3	YTO	5086-6131	5086-7131

[1] When ordering extra assemblies for spare parts stock, use new assembly part number only. Exchange orders require return of the defective part.

Table 6-2. Reference Designations and Abbreviations (1 of 2)

REFERENCE DESIGNATIONS

A . . . . . assembly
AT . . attenuator; isolator; termination
B . . . . . fan; motor
BT . . . . . battery
C . . . . . capacitor
CP . . . . . coupler
CR . . . . . diode; diode thyristor; varactor
DC . . . directional coupler
DL . . . . . delay line
DS . . . . . annunciator; signaling device (audible or visual); lamp; LED
E . . . . . miscellaneous electrical part
F . . . . . fuse
FL . . . . . filter
H . . . . . hardware
HY . . . . . circulator
J . . . electrical connector (stationary portion); jack
K . . . . . relay
L . . . . . coil; inductor
M . . . . . meter
MP . . . . . miscellaneous mechanical part
P . . . electrical connector (movable portion); plug
Q . . . . . transistor: SCR; triode thyristor
R . . . . . resistor
RT . . . . . thermistor
S . . . . . switch
T . . . . . transformer
TB . . . . . terminal board
TC . . . . . thermocouple
TP . . . . . test point
U . . . . . integrated circuit; microcircuit
V . . . . . electron tube
VR . . . . voltage regulator; breakdown diode
W . . . . cable; transmission path; wire
X . . . . . socket
Y . . . . crystal unit (piezo-electric or quartz)
Z . . . . tuned cavity; tuned circuit

ABBREVIATIONS

A . . . . . ampere
ac . . . . alternating current
ACCESS . . . . . accessory
ADJ . . . . . adjustment
A/D . . . . analog-to-digital
AF . . . . . audio frequency
AFC . . . . . automatic frequency control
AGC . . . . . automatic gain control
AL . . . . . aluminum
ALC . . . . . automatic level control
AM . . . amplitude modulation
AMPL . . . . . amplifier
APC . . . . automatic phase control
ASSY . . . . . assembly
AUX . . . . . auxiliary
avg . . . . . average
AWG . . . . American wire gauge
BAL . . . . . balance
BCD . . . . . binary coded decimal
BD . . . . . board
BE CU . . . . . beryllium copper
BFO . . . . . beat frequency oscillator
BH . . . . . binder head
BKDN . . . . . breakdown
BP . . . . . bandpass
BPF . . . . . bandpass filter
BRS . . . . . brass
BWO . . . . . backward-wave oscillator
CAL . . . . . calibrate
ccw . . counter-clockwise
CER . . . . . ceramic
CHAN . . . . . channel
cm . . . . . centimeter
CMO . . cabinet mount only
COAX . . . . . coaxial
COEF . . . . . coefficient
COM . . . . . common
COMP . . . . . composition
COMPL . . . . . complete
CONN . . . . . connector
CP . . . . . cadmium plate
CRT . . . cathode-ray tube
CTL . . . . complementary transistor logic
CW . . . . . continuous wave
cw . . . . . clockwise
cm . . . . . centimeter
D/A . . . . digital-to-analog
dB . . . . . decibel
dBm . . . . decibel referred to 1 mW
dc . . . . . direct current
deg . . degree (temperature interval or difference)
° . . . . . degree (plane angle)
°C . . . . . degree Celsius (centigrade)
°F . . . . degree Fahrenheit
°K . . . . . degree Kelvin
DEPC . . deposited carbon
DET . . . . . detector
diam . . . . . diameter
DIA . . . diameter (used in parts list)
DIFF AMPL . . differential amplifier
div . . . . . division
DPDT . . . . . double-pole, double-throw
DR . . . . . drive
DSB . . . . double sideband
DTL . . . . diode transistor logic
DVM . . . digital voltmeter
ECL . . . . emitter coupled logic
EMF . . electromotive force
EDP . . . . . electronic data processing
ELECT . . . . . electrolytic
ENCAP . . . . encapsulated
EXT . . . . . external
F . . . . . farad
FET . . . . . field-effect transistor
F/F . . . . . flip-flop
FH . . . . . flat head
FIL H . . . . . fillister head
FM . . frequency modulation
FP . . . . . front panel
FREQ . . . . . frequency
FXD . . . . . fixed
g . . . . . gram
GE . . . . . germanium
GHz . . . . . gigahertz
GL . . . . . glass
GRD . . . . . ground(ed)
H . . . . . henry
h . . . . . hour
HET . . . . . heterodyne
HEX . . . . . hexagonal
HD . . . . . head
HDW . . . . . hardware
HF . . . . . high frequency
HG . . . . . mercury
HI . . . . . high
HP . . . . . Hewlett-Packard
HPF . . . . . high pass filter
HR . . . . . hour (used in parts list)
HV . . . . . high voltage
Hz . . . . . Hertz
IC . . . . integrated circuit
ID . . . . . inside diameter
IF . . . . . intermediate frequency
IMPG . . . . . impregnated
in . . . . . inch
INCD . . . . . incandescent
INCL . . . . . include(s)
INP . . . . . input
INS . . . . . insulation
INT . . . . . internal
kg . . . . . kilogram
kHz . . . . . kilohertz
kΩ . . . . . kilohm
kV . . . . . kilovolt
lb . . . . . pound
LC . . . . . inductance-capacitance
LED . . light-emitting diode
LF . . . . . low frequency
LG . . . . . long
LH . . . . . left hand
LIM . . . . . limit
LIN . . . linear taper (used in parts list)
lin . . . . . linear
LK WASH . . . lock washer
LO . . . low; local oscillator
LOG . . . . logarithmic taper (used in parts list)
log . . . . . logrithm(ic)
LPF . . . . . low pass filter
LV . . . . . low voltage
m . . . . . meter (distance)
mA . . . . . milliampere
MAX . . . . . maximum
MΩ . . . . . megohm
MEG . . . . meg (10^6) (used in parts list)
MET FLM . . . . metal film
MET OX . . metallic oxide
MF . . . medium frequency; microfarad (used in parts list)
MFR . . . . . manufacturer
mg . . . . . milligram
MHz . . . . . megahertz
mH . . . . . millihenry
mho . . . . . mho
MIN . . . . . minimum
min . . . . . minute (time)
. . .' . . . . . minute (plane angle)
MINAT . . . . . miniature
mm . . . . . millimeter

NOTE

All abbreviations in the parts list will be in upper-case.

Table 6-2. Reference Designations and Abbreviations (2 of 2)

MOD . . . . . modulator
MOM . . . . . momentary
MOS . . . . . metal-oxide semiconductor
ms . . . . . millisecond
MTG . . . . . mounting
MTR . . . meter (indicating device)
mV . . . . . millivolt
mVac . . . . . millivolt, ac
mVdc . . . . . millivolt, dc
mVpk . . . . millivolt, peak
mVp-p . . . millivolt, peak-to-peak
mVrms . . . . millivolt, rms
mW . . . . . milliwatt
MUX . . . . . multiplex
MY . . . . . mylar
μA . . . . . microampere
μF . . . . . microfarad
μH . . . . . microhenry
μmho . . . . . micromho
μs . . . . . microsecond
μV . . . . . microvolt
μVac . . . . . microvolt, ac
μVdc . . . . . microvolt, dc
μVpk . . . microvolt, peak
μVp-p . . . microvolt, peak-to-peak
μVrms . . . . microvolt, rms
μW . . . . . microwatt
nA . . . . . nanoampere
NC . . . . . no connection
N/C . . . . normally closed
NE . . . . . neon
NEG . . . . . negative
nF . . . . . nanofarad
NI PL . . . . . nickel plate
N/O . . . . . normally open
NOM . . . . . nominal
NORM . . . . . normal
NPN . . . negative-positive-negative
NPO . . . . negative-positive zero (zero temperature coefficient)
NRFR . . not recommended for field replacement
NSR . . . . . not separately replaceable
ns . . . . . nanosecond
nW . . . . . nanowatt
OBD . . . order by description
OD . . . . . outside diameter
OH . . . . . oval head
OP AMPL . . . operational amplifier
OPT . . . . . option
OSC . . . . . oscillator
OX . . . . . oxide
oz . . . . . ounce
Ω . . . . . ohm
P . . . . peak (used in parts list)
PAM . . . . pulse-amplitude modulation
PC . . . . . printed circuit
PCM . . pulse-code modulation; pulse-count modulation
PDM . . . . . pulse-duration modulation
pF . . . . . picofarad
PH BRZ phosphor bronze
PHL . . . . . Phillips
PIN . . . positive-intrinsic-negative
PIV . . . . . peak inverse voltage
pk . . . . . peak
PL . . . . . phase lock
PLO . . . . . phase lock oscillator
PM . . . . phase modulation
PNP . . . positive-negative-positive
P/O . . . . . part of
POLY . . . . . polystyrene
PORC . . . . . porcelain
POS . . positive; position(s) (used in parts list)
POSN . . . . . position
POT . . . . . potentiometer
p-p . . . . . peak-to-peak
PP . . . peak-to-peak (used in parts list)
PPM . . . . . pulse-position modulation
PREAMPL . . . preamplifier
PRF . . . . pulse-repetition frequency
PRR . . . . pulse repetition rate
ps . . . . . picosecond
PT . . . . . point
PTM . . . . . pulse-time modulation
PWM . . . . . pulse-width modulation
PWV . . . . . peak working voltage
RC . . . . . resistance-capacitance
RECT . . . . . rectifier
REF . . . . . reference
REG . . . . . regulated
REPL . . . . . replaceable
RF . . . . . radio frequency
RFI . . . . radio frequency interference
RH . . . . round head; right hand
RLC . . . . . resistance-inductance-capacitance
RMO . . . rack mount only
rms . . . . root-mean-square
RND . . . . . round
ROM . . read-only memory
R&P . . . . . rack and panel
RWV . . . reverse working voltage
S . . . scattering parameter
s . . . . . second (time)
. . . " . second (plane angle)
S-B . . . . . slow-blow (fuse) (used in parts list)
SCR . . . silicon controlled rectifier; screw
SE . . . . . selenium
SECT . . . . . sections
SEMICON . . . . . semiconductor
SHF . . . . . superhigh frequency
SI . . . . . silicon
SIL . . . . . silver
SL . . . . . slide
SNR . . signal-to-noise ratio
SPDT . . . . . single-pole, double-throw
SPG . . . . . spring
SR . . . . . split ring
SPST . . . . . single-pole, single-throw
SSB . . . . . single sideband
SST . . . . . stainless steel
STL . . . . . steel
SQ . . . . . square
SWR . . standing-wave ratio
SYNC . . . . . synchronize
T . . timed (slow-blow fuse)
TA . . . . . tantalum
TC . . . . . temperature compensating
TD . . . . . time delay
TERM . . . . . terminal
TFT . . thin-film transistor
TGL . . . . . toggle
THD . . . . . thread
THRU . . . . . through
TI . . . . . titanium
TOL . . . . . tolerance
TRIM . . . . . trimmer
TSTR . . . . . transistor
TTL . . transistor-transistor logic
TV . . . . . television
TVI television interference
TWT . . traveling wave tube
U . . . . . micro (10^{-6}) (used in parts list)
UF . . . microfarad (used in parts list)
UHF . . ultrahigh frequency
UNREG . . . . unregulated
V . . . . . volt
VA . . . . . voltampere
Vac . . . . . volts, ac
VAR . . . . . variable
VCO . . . voltage-controlled oscillator
Vdc . . . . . volts, dc
VDCW . . volts, dc, working (used in parts list)
V(F) . . . . . volts, filtered
VFO . . variable-frequency oscillator
VHF . . . . . very-high frequency
Vpk . . . . . volts, peak
Vp-p . . volts, peak-to-peak
Vrms . . . . . volts, rms
VSWR . . . voltage standing wave ratio
VTO . . . . . voltage-tuned oscillator
VTVM . . . . vacuum-tube voltmeter
V(X) . . . . . volts, switched
W . . . . . watt
W/ . . . . . with
WIV . . . . working inverse voltage
WW . . . . . wirewound
W/O . . . . . without
YIG . . yttrium-iron-garnet
Z_o . . . . . characteristic impedance

NOTE

All abbreviations in the parts list will be in upper-case.

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1				RF OUTPUT ASSEMBLY		
A1A1	08672-60101	2	1	BOARD ASSEMBLY, FRONT PANEL	28480	08672-60101
A1A1C1	0180-0229	7	2	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A1A1C2	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A1A1C3†	0160-0174	9	4	CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A1A1DS1	2140-0427	5	16	LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS2	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS2	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS3	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS4	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS5	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS7	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS8	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS9	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS10	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS11	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427.
A1A1DS12	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS13	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS14	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS15	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1DS16	2140-0427	5		LAMP-INCAND 5VDC 60MA T-1-BULB	28480	2140-0427
A1A1J1	1251-3025	9	1	CONNECTOR 34-PIN M RECTANGULAR	28480	1251-3025
A1A1J2	1251-3119	2	1	CONNECTOR 20-PIN M RECTANGULAR	28480	1251-3119
A1A1J3	1200-0645	6	1	SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0645
A1A1MP1	1200-0448	7		SOCKET-IC 1-CONT DIP-SLDR (P/O A1A1XA1A2A, B, AND C)	28480	1200-0448
A1A1Q1	1854-0071	7	31	TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A1Q2	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A1Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A1Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A1R1	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A1A1R2	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A1A1R3	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A1A1R4				NOT ASSIGNED		
A1A1R5				NOT ASSIGNED		
A1A1R6				NOT ASSIGNED		
A1A1R7	0698-7216	3	2	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A1A1R8	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A1A1R9	0698-7212	9	4	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A1A1R10	0698-7230	1	2	RESISTOR 562 1% .05W F TC=0+-100	24546	C3-1/8-TO-562R-F
A1A1R11	0698-7229	8	4	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A1A1R12	0698-7264	1	5	RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1472-F
A1A1R13	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A1A1U1	1820-1146	8	1	IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A1A1XA1A2A			2	NSR (INCLUDES A1A1MP1)		
A1A1XA1A2B				NSR (INCLUDES A1A1MP1)		
A1A1XA1A2C				NSR (INCLUDES A1A1MP1)		
				A1A1 MISCELLANEOUS		
	0360-0124	3	1	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
	0361-0028	8	15	RIVET-SEMITUB OVH .089 DIA .312 LG	00000	ORDER BY DESCRIPTION
	1200-0448	7	34	SOCKET-IC 1-CONT DIP-SLDR	28480	1200-0448
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
	08672-20060	8	1	GUIDE, SLIDE SWITCH	28480	08672-20060
	08672-20061	9	2	GUIDE, SLIDE SWITCH	28480	08672-20061
	08672-20062	0	1	GUIDE, SLIDE SWITCH	28480	08672-20062
	08672-20063	1	2	GUIDE, SLIDE SWITCH	28480	08672-20063
A1A2	08672-60042	0	1	DISPLAY DRIVER ASSEMBLY	28480	08672-60042
A1A2P1A	1260-0363	1	3	CONN-LEAD FRAME 11 PINS PER STRIP	28480	1260-0363
A1A2P1B	1260-0363	1		CONN-LEAD FRAME 11 PINS PER STRIP	28480	1260-0363
A1A2P1C	1260-0363	1		CONN-LEAD FRAME 11 PINS PER STRIP	28480	1260-0363
A1A2Q1	1853-0020	4	26	TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q2	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q3	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q4	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q5	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q6	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q7	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q8	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q9	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q10	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A2Q11	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q12	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q13	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q14	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A2Q15	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A2Q16	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A2Q17	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A2Q18	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A2R1	1810-0158	9	2	NETWORK-RES 7-SIP56.0K OHM X 6	28480	1810-0158
A1A2R2	1810-0158	9		NETWORK-RES 7-SIP56.0K OHM X 6	28480	1810-0158
A1A2R3	0698-7244	7	16	RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R4	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R5	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R6	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R7	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R8	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R9	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R10	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R11	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R12	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R13	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R14	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R15	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R16				NOT ASSIGNED		
A1A2R17	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R18	0698-7233	4	4	RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A1A2R19	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2R20	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A1A2U1	1820-1746	4	3	IC BFR CMOS INV HEX	04713	MC14049UBCP
A1A2U2	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A1A3	5086-7151	3	1	YTM ASSEMBLY (INCLUDES A1A3A1)	28480	5086-7151
A1A3	5086-6151	1	1	YTM ASSEMBLY(RESTORED 5086-7151)	28480	5086-6151
A1A3CR2	1901-0376	6	10	DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A3A1	5061-1036	9	1	YTM, HEATER CONTROL ASSEMBLY	28480	5061-1036
A1A3A1C1	0180-2182	5	1	CAPACITOR-FXD 180UF+-10% 50VDC TA	56289	150D186X9050R2
A1A3A1C2	0160-0127	2	2	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A1A3A1CR1	1901-0033	2	9	DIODE-GEN PRP 130V 200MA DO-7	28480	1901-0033
A1A3A1J1	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A1A3A1MP1	0380-0322	5	2	SPACER-RVT-ON .062-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
A1A3A1MP2	0380-0322	5		SPACER-RVT-ON .062-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
A1A3A1Q1	1853-0038	4	2	TRANSISTOR PNP SI TO-39 PD=1W FT=100MHZ	28480	1853-0038
A1A3A1Q2	1853-0038	4		TRANSISTOR PNP SI TO-39 PD=1W FT=100MHZ	28480	1853-0038
A1A3A1R1†	0698-7245	8	2	RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A1A3A1R2†	0698-7260	7	37	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A3A1R3	0698-7273	2	2	RESISTOR 34.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3482-F
A1A3A1R4	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A1A3A1R5	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A1A3A1R6	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A3A1R7	0698-3102	8	1	RESISTOR 237 1% .5W F TC=0+-100	28480	0698-3102
A1A3A1R8	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A3A1R9	0698-7273	2		RESISTOR 34.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3482-F
A1A3A1R10†	0698-8827	4	1	RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A1A3A1R11†	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A1A3A1U1	1826-0261	8	1	IC OP AMP LOW-NOISE TO-99 PKG	28480	1826-0261
A1A3A1VR1	1902-0176	6	1	DIODE-ZNR 47V 5% PD=1W IR=5UA	28480	1902-0176
A1A3A1VR2	1902-0025	4	5	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A1A4				NOT ASSIGNED		
A1A5	08672-60044	2	1	ASSEMBLY, ALC	28480	08672-60044
A1A5C1	0180-0197	8	22	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A5C2	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A5C3	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A5C4	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A5C5	0160-2209	5	1	CAPACITOR-FXD 360PF +-5% 300VDC MICA	28480	0160-2209
A1A5C6	0160-4084	8	15	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C7	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C8	0160-2201	7	1	CAPACITOR-FXD 51PF +-5% 300VDC MICA	28480	0160-2201
A1A5C9	0160-3787	6	1	CAPACITOR-FXD 1UF +-10% 50VDC MET-POLYC	28480	0160-3787
A1A5C10	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5C11	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A5C12	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A1A5C13	0160-2203	9	1	CAPACITOR-FXD 91PF +-5% 300VDC MICA 0+70	28480	0160-2203
A1A5C14	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A5C16	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C17	0160-2257	3	1	CAPACITOR-FXD 10PF +-5% 500VDC CER 0+-60	28480	0160-2257
A1A5C18	0160-2199	2	1	CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A1A5C19	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C20	0160-0157	8	1	CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A1A5C21	0160-2055	9	5	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A5C22	0160-3466	8	2	CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A1A5C23	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C24	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C25	0160-2256	2	2	CAPACITOR-FXD 9.1PF +-.25PF 500VDC CER	28480	0160-2256
A1A5CR1	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A1A5CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A5CR3	1901-0050	3	37	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A5CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A5CR5	1901-1096	9	1	DIODE-PIN	28480	1901-1096
A1A5CR6†	1901-0539	3	3	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A1A5CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A5CR8	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A5L1	9140-0144	0	6	INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A5L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A5L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A5L4†	9100-1623	8	1	INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A1A5Q1†				NOT ASSIGNED		
A1A5Q2	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A1A5Q3	1853-0322	9	7	TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q4	1854-0404	0	6	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5Q5	1854-0013	7	1	TRANSISTOR NPN 2N2218A SI TO-5 PD=800MW	04713	2N2218A
A1A5Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5Q7	1854-0688	2	1	TRANSISTOR-DUAL NPN TO-71	28480	1854-0688
A1A5Q8	1854-0475	5	2	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A1A5Q9	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q10	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q11	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q12	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q13	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5R1	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R2	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R3	0757-0465	6	10	RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A5R4	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A5R5	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F
A1A5R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A5R7	2100-3353	8	5	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A5R8	0757-0442	9	20	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R10	0698-3432	7	2	RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A1A5R11	0698-3157	3	6	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A5R12†	0757-0439	4	2	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A1A5R13†	0698-3155	1	4	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1A5R14	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A5R15†	0698-0085	0	5	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1A5R16†	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1A5R17	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A5R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A5R19	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R20	0757-1094	9	2	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A1A5R21	2100-3274	2	7	RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R23	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R24	0698-0083	8	5	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A1A5R25	0757-0438	3	11	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A5R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A5R27	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A1A5R28	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A5R29	0698-4414	7	1	RESISTOR 158 1% .125W F TC=0+-100	24546	C4-1/8-T0-158R-F
A1A5R30	0698-4014	3	1	RESISTOR 787 1% .125W F TC=0+-100	24546	C4-1/8-T0-787R-F
A1A5R31†	0698-3626	1	1	RESISTOR 180 5% 2W MO TC=0+-200	28480	0698-3626
A1A5R32	0698-3510	2	1	RESISTOR 453 1% .125W F TC=0+-100	24546	C4-1/8-T0-453R-F
A1A5R33	0698-3495	2	1	RESISTOR 866 1% .125W F TC=0+-100	24546	C4-1/8-T0-866R-F
A1A5R34	0757-0346	2	5	RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A1A5R35†				NOT ASSIGNED		

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5R36†	0757-0394	0	6	RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A5R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R38	0757-0317	7	2	RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A1A5R39	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A5R40	0698-0084	9	7	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A5R41	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1A5R42	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A1A5R43	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1A5R44	0698-3444	1	4	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1A5R45	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R46	0757-0416	7	2	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-5110-F
A1A5R47	0757-0276	7	1	RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A1A5R48	0757-0290	5	3	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1A5R49	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A1A5R50	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A5R51	0698-3132	4	3	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A5R52	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A5R53	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R54	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R55	0698-3162	0	3	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F
A1A5R56	0757-0403	2	2	RESISTOR 121 1% .125W F TC=0+-100	24546	C4-1/8-T0-121R-F
A1A5R57	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A5R58	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A5R59	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A5R60	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R61	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A1A5R62	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2872-F
A1A5R63	0698-3236	9	4	RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A5R64	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1A5R65	0698-3445	2	1	RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-34ER-F
A1A5R66	0698-3236	9		RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A5R67	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R68†	0757-0278	9	1	RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A1A5R69†	2100-3351	6	2	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	28480	2100-3351
A1A5R70	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A5R71	0698-7576	8	2	RESISTOR 217 .1% .125W F TC=0+-25	19701	MF4C1/8-T9-217R-B
A1A5R72	0757-0402	1	3	RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A1A5R73	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A1A5R74	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A5R75†	0757-0421	4	5	RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP2				NOT ASSIGNED		
A1A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5U1	1826-0486	9	1	IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-P	04713	MC14052BCP
A1A5U2	1826-0501	9	3	IC MULTIPLXR 2-CHAN-ANLG TRIPLE 16-DIP-P	04713	MC14053BCP
A1A5U3	1826-0081	0	5	IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U4	1826-0059	2	6	IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A5U5	1820-0125	1		IC COMPARATOR GP DUAL TO-100 PKG	07263	711HC
A1A5U6	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U7	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U8	1820-0223	0	7	IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A5VR1	1902-0041	4	4	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A1A5VR2	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A1A5VR3	1902-0064	1	1	DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.05%	28480	1902-0064
A1A5VR4	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
				A1A5 MISCELLANEOUS		
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
	1480-0073	6	12	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3	7	EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0755	2	1	EXTR-PC BD VIO POLYC .062-BD-THKNS	28480	4040-0755
A1A6†	08672-60126	1	1	BOARD ASSEMBLY, DETECTOR	28480	08672-60126
A1A6C1	0160-0174	9		CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A1A6C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A6C3	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C4	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C5	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A6C6	0160-2240	4	1	CAPACITOR-FXD 2PF +-.25PF 500VDC CER	28480	0160-2240
A1A6C7	0160-0174	9		CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A1A6C8	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A6C9	0160-2207	3	3	CAPACITOR-FXD 300PF +-5% 300VDC MICA	28480	0160-2207
A1A6C10	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A6C11	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A6C12	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A6C13	0160-3456	6	1	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A1A6C14	0160-2207	3		CAPACITOR-FXD 300PF +-5% 300VDC MICA	28480	0160-2207
A1A6C15	0160-3466	8		CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A1A6C16	0160-0575	4	1	CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A1A6C17	0180-2206	4	3	CAPACITOR-FXD 60UF+-10% 6VDC TA	56289	150D606X9006B2
A1A6C18	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C19	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A6C20	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A6C21	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C22	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C23	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C24	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C25	0160-2256	2		CAPACITOR-FXD 9.1PF +-.25PF 500VDC CER	28480	0160-2256
A1A6C26	0160-2207	3		CAPACITOR-FXD 300PF +-5% 300VDC MICA	28480	0160-2207
A1A6C27†	0160-3094	8	1	CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
A1A6C28†	0160-3879	7	3	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1A6C29†	0160-0574	3	1	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A1A6C30†	0180-0291	3	20	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A6CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A6CR2	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A1A6CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A6CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A6CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A6CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1A6L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A6L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A6L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A1A6L4	9140-0158	6	1	INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A1A6Q1	1853-0034	0	2	TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A1A6Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A6Q3	1853-0316	1	1	TRANSISTOR-DUAL PNP PD=500MW	28480	1853-0316
A1A6Q4	1854-0689	3	1	TRANSISTOR-DUAL NPN TO-71	28480	1854-0689
A1A6Q5	1853-0388	7	1	TRANSISTOR-DUAL PNP PD=600MW	28480	1853-0388
A1A6Q6	1855-0081	1	2	TRANSISTOR J-FET N-CHAN D-MODE SI	28480	1855-0081
A1A6Q7	1855-0081	1		TRANSISTOR J-FET N-CHAN D-MODE SI	28480	1855-0081
A1A6Q8	1854-0345	8	2	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A1A6Q9	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A1A6Q10†	1855-0049	1	1	TRANSISTOR-JFET DUAL N-CHAN D-MODE SI	28480	1855-0049
A1A6R1	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A1A6R2	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A6R3	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A6R4	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A6R5	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A6R6	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A1A6R7	0757-0401	0	5	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1A6R8	0698-3432	7		RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A1A6R9	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A6R10	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A6R11	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A6R12	2100-2039	5	2	RESISTOR-TRMR 20K 5% WW SIDE-ADJ 10-TRN	28480	2100-2039
A1A6R13	0757-0419	0	3	RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A1A6R14	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R15	2100-2039	5		RESISTOR-TRMR 20K 5% WW SIDE-ADJ 10-TRN	28480	2100-2039
A1A6R16	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R17	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R18	0698-3435	0	1	RESISTOR 38.3 1% .125W F TC=0+-100	24546	C4-1/8-T0-38R3-F
A1A6R19	0698-3151	7	4	RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A1A6R20	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A6R21	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R22	0757-0422	5	1	RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A1A6R23	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R24	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A1A6R25	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A6R26	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A1A6R27	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A1A6R28	2100-3164	9	1	RESISTOR-TRMR 10 20% C SIDE-ADJ 17-TRN	02111	43P100
A1A6R29	0757-0439	4		RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A1A6R30	0757-0461	2	3	RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6812-F
A1A6R31	0698-3456	5	1	RESISTOR 287K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2873-F
A1A6R32	0757-0463	4		RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8252-F
A1A6R33	2100-1922	3	1	RESISTOR-TRMR 5K 10% C SIDE-ADJ 22-TRN	32997	3059Y-1-502
A1A6R34	0757-0428	1	1	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A1A6R35	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A6R36	2100-3273	1	1	RESISTOR-TRMR 2K 10% C SIDE-ADJ 1-TRN	28480	2100-3273
A1A6R37	0811-3249	6	1	RESISTOR 17.74K .1% .125W PWW TC=0+-10	20940	114-1/16-17741-B
A1A6R38	2100-3056	8	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A1A6R39	2100-3056	8		RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A1A6R40	0811-3202	1	1	RESISTOR 30.615K .1% .05W PWW TC=0+-10	14140	1409-1/40-30615R-B
A1A6R41	0811-1176	4	1	RESISTOR 4.64K 1% .125W PWW TC=0+-10	07088	KP61-4641-1
A1A6R42	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A6R43	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1A6R44	0698-3152	8	3	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A1A6R45	0698-3236	9		RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A6R46	0698-6329	7	1	RESISTOR 845 1% .125W F TC=0+-25	28480	0698-6329
A1A6R47	0811-2031	2	1	RESISTOR 815 3% .25W PWW TC=+5900+-300	20940	143-1/4-815R-3
A1A6R48	0698-8584	0	2	RESISTOR 274 1% .125W F TC=0+-25	28480	0698-8584
A1A6R49	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1A6R50	0698-3440	7	1	RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A1A6R51	0698-3236	9		RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A6R52	0698-8584	0		RESISTOR 274 1% .125W F TC=0+-25	28480	0698-8584
A1A6R53	0698-6362	8	1	RESISTOR 1K .1% .125W F TC=0+-25	28480	0698-6362
A1A6R54	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1A6R55	0698-7576	8		RESISTOR 217 .1% .125W F TC=0+-25	19701	MF4C1/8-T9-217R-B
A1A6R56	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A6R57	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A6R58†	0698-3260	9	13	RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A6R59†	0698-7278	7	1	RESISTOR 56.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5622-F
A1A6R60†	0698-7235	6	2	RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A1A6R61†	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A1A6R62†	0698-7267	4	1	RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A1A6R63†	0698-7257	2	1	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A1A6R64†	0698-7236	7	7	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A6R65†	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A6R66†	0698-3447	4	1	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A1A6R67†	0698-7220	9	2	RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A1A6R68†	0698-3438	3	1	RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A1A6R69†	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A6R70†	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A6R71†	0757-0274	5	2	RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A1A6R72†	0698-7284	5	2	RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A1A6R73†	0757-0459	8	1	RESISTOR 56.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5622-F
A1A6R74†	0698-7188	8	9	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A6R75†	0757-0458	7	9	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A6RT1	0837-0124	4	1	THERMISTOR DISC 250-OHM TC=-4.4%/C-DEG	28480	0837-0124
A1A6TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP7†	1251-0600	0	40	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A6U1	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A6U2	1826-0501	9		IC MULTIPLXR 2-CHAN-ANLG TRIPLE 16-DIP-P	04713	MC14053BCP
A1A6U3	1826-0059	2		IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A6U4	1826-0501	9		IC MULTIPLXR 2-CHAN-ANLG TRIPLE 16-DIP-P	04713	MC14053BCP
A1A6U5	1826-0059	2		IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A6U6	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A6U7	1826-0266	3	1	IC OP AMP LOW-DRIFT TO-99 PKG	06665	OP-05EJ
A1A6U8	1826-0229	8	2	IC OP AMP LOW-DRIFT TO-99 PKG	06665	OP-05CJ
A1A6U9*	1820-0125	1	2	IC COMPARATOR GP DUAL TO-100 PKG	07263	711HC
A1A6U10†	1820-1422	3	1	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A1A6U11†	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A1A6VR1	1902-0041	4		DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A1A6VR2†	1902-3182	0	1	DIODE-ZNR 12.1V 5% DO-35 PD=.4W	28480	1902-3182
A1A6VR3†	1902-0049	2	1	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A1A6VR4†	1902-3048	7	1	DIODE-ZNR 3.48V 5% DO-35 PD=.4W	28480	1902-3048
A1A6W1	08672-60064	6	1	CABLE ASSEMBLY, DETECTOR	28480	08672-60064
				A1A6 MISCELLANEOUS		
	1400-0249	0	1	CABLE TIE .062-.625-DIA .091-WD NYL	06383	PLT1M-8
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0754	1	1	EXTR-PC BD BLU POLYC .062-BD-THKNS	28480	4040-0754
A1A7	08672-60116	9	1	ASSEMBLY, SRD BIAS	28480	08672-60116

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A7C1	0180-2141	6	5	CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2
A1A7C2	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A7C3	0180-2141	6		CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2
A1A7C4	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A7C5	0160-2150	5	7	CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A7C6	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A7CR1	1901-0518	8	1	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A1A7CR2	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1A7Q1				NOT ASSIGNED		
A1A7Q2				NOT ASSIGNED		
A1A7Q3				NOT ASSIGNED		
A1A7Q4	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A7Q5	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A7Q6				NOT ASSIGNED		
A1A7Q7				NOT ASSIGNED		
A1A7Q8	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A7Q9	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A7Q10	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A7Q11	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A7Q12	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A7Q13	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A7Q14	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A7Q15	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A7R1	0698-3161	9	1	RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A1A7R2	0698-3158	4	1	RESISTOR 23.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2372-F
A1A7R3	0757-0443	0	1	RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A1A7R4	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A7R5	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R6	0698-3160	8	2	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A1A7R7	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A1A7R8	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A7R9	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A7R10	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A7R11	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R12	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R13	0757-0441	8	1	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A1A7R14	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A1A7R15	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R16	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A1A7R17	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R18	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A7R19	0757-0462	3	1	RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7502-F
A1A7R20	0757-0440	7	1	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A1A7R21	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1A7R22	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6812-F
A1A7R23	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R24	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6812-F
A1A7R25	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A7R26	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A7R27	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A1A7R28	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1A7R29	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A7R30	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A7R31	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A7R32	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A1A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A7U1				NOT ASSIGNED		
A1A7U2	1826-0092	3	1	IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A1A7U3				NOT ASSIGNED		
A1A7U4	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A7U5	1820-0681	4	1	IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A1A7VR1	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
				A1A7 MISCELLANEOUS		
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0753	0	1	EXTR-PC BD GRN POLYC .062-BD-THKNS	28480	4040-0753
A1A8	08672-60051	1	1	ASSEMBLY, YTM DRIVER	28480	08672-60051
A1A8C1	0180-2141	6		CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2
A1A8C2	0180-2141	6		CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2
A1A8C3	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A8C4	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A8C5	0180-2141	6		CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A8C6	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C7	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A8C8	0160-3451	1	7	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C9	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C10	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C11	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C12	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C13	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C14	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C15	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C16	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C17	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C18	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A1A8C19	0160-2150	5		CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A1A8C20	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A8C21	0160-0174	9		CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A1A8CR1	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR2	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR3	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR4	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR5	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR6	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR7	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR8	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8CR9	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A1A8Q1	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A8Q2	1853-0451	5	3	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A1A8Q3	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A8Q4	1855-0020	8	5	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A1A8Q5	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A1A8Q6	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A1A8Q7	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A1A8Q8	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A8Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A1A8Q10	1853-0235	3	2	TRANSISTOR PNP SI TO-18 PD=400MW	28480	1853-0235
A1A8Q11	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A8Q12	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A8Q13	1853-0235	3		TRANSISTOR PNP SI TO-18 PD=400MW	28480	1853-0235
A1A8Q14	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A8Q15	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A8Q16	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A8R1	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1A8R2	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1A8R3	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R4	0811-3396	4	1	RESISTOR 11K 1% .05W PWW TC=0+-2	28480	0811-3396
A1A8R5	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A8R6	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A8R7	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R8	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1623-F
A1A8R9	0811-3378	2	1	RESISTOR 3.79K .1% .125W PWW TC=0+-10	28480	0811-3378
A1A8R10	0811-3377	1	1	RESISTOR 5.62K .1% .125W PWW TC=0+-10	28480	0811-3377
A1A8R11	2100-3103	6	5	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A1A8R12	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A1A8R13	0698-3457	6	1	RESISTOR 316K 1% .125W F TC=0+-100	28480	0698-3457
A1A8R14	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A1A8R15	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A8R16	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A1A8R17	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A8R18	0811-3375	9	1	RESISTOR 10.4K .1% .05W PWW TC=0+-10	28480	0811-3375
A1A8R19	0811-3376	0	1	RESISTOR 14.7K .1% .05W PWW TC=0+-10	28480	0811-3376
A1A8R20	2100-3152	5	1	RESISTOR-TRMR 5K 10% MF SIDE-ADJ 25-TRN	28480	2100-3152
A1A8R21	0811-3371	5	1	RESISTOR 25.6K 1% .05W PWW TC=0+-10	28480	0811-3371
A1A8R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R23	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A8R24	0811-3373	7	1	RESISTOR 17.8K .1% .05W PWW TC=0+-10	28480	0811-3373
A1A8R25	0811-3374	8	1	RESISTOR 23.7K .1% .05W PWW TC=0+-10	28480	0811-3374
A1A8R26	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A1A8R27	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A8R28	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A1A8R29	0811-3379	3	1	RESISTOR 5.13K .1% .05W PWW TC=0+-2	28480	0811-3379
A1A8R30	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A8R31	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R32	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A8R33	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F
A1A8R34	0757-0289	2	2	RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A1A8R35	0811-3366	8	2	RESISTOR 5K .1% .05W PWW TC=0+-2	28480	0811-3366

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A8R36	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R37	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A1A8R38	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A1A8R39	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A8R40	0811-3366	8		RESISTOR 5K .1% .05W PWW TC=0+-2	28480	0811-3366
A1A8R41	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A1A8R42	0811-3370	4	2	RESISTOR 20K 1% .05W PWW TC=0+-10	28480	0811-3370
A1A8R43	0811-3370	4		RESISTOR 20K 1% .05W PWW TC=0+-10	28480	0811-3370
A1A8R44	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A8R45	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8R46	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A1A8R47	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A1A8R48	0811-3135	9	3	RESISTOR 10K .1% .125W PWW TC=0+-10	28480	0811-3135
A1A8R49	0811-3135	9		RESISTOR 10K .1% .125W PWW TC=0+-10	28480	0811-3135
A1A8R50	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A8R51	0811-3369	1	1	RESISTOR 12K .1% .125W PWW TC=0+-10	28480	0811-3369
A1A8R52	0811-3135	9		RESISTOR 10K .1% .125W PWW TC=0+-10	28480	0811-3135
A1A8R53	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A8R54	0811-3368	0	1	RESISTOR 100K 1% .05W PWW TC=0+-10	28480	0811-3368
A1A8R55	0811-2310	0	1	RESISTOR 2K 1% .125W PWW TC=0+-10	07088	EP20-1/8-D-2001-F
A1A8R56	0811-2870	7	2	RESISTOR 1.96K 1% .05W PWW TC=0+-10	14140	1409-1/20-D-1961-F
A1A8R57	0811-2870	7		RESISTOR 1.96K 1% .05W PWW TC=0+-10	14140	1409-1/20-D-1961-F
A1A8R58	0811-3372	6	1	RESISTOR 1.71K 1% .05W PWW TC=0+-10	28480	0811-3372
A1A8R59	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A8R60	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A8R61	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A8R62	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A8R63	0698-3439	4	1	RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A1A8R64	2100-3351	6		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	28480	2100-3351
A1A8R65	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1A8R66	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1A8R67	0811-3157	5	1	RESISTOR 1K 1% .125W PWW TC=0+-10	14140	1274-1/8-1001-F
A1A8R68	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MFAC1/8-T0-1332-F
A1A8R69	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A1A8U1	1826-0502	0	2	IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A1A8U2	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A8U3	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A8U4	1826-0502	0		IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A1A8U5	1826-0229	8		IC OP AMP LOW-DRIFT TO-99 PKG	06665	OP-05CJ
A1A8U6	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A8U7	1826-0059	2		IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A8U8	1826-0059	2		IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A8U9	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A8VR1	1902-0041	4		DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A1A8VR2	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A1A8VR3	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A1A8VR4	1902-3193	3	1	DIODE-ZNR 13.3V 5% DO-35 PD=.4W	28480	1902-3193
A1A8VR5	1902-0680	7	2	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A1A8VR6	1902-3268	3	1	DIODE-ZNR 26.1V 5% DO-35 PD=.4W	28480	1902-3268
				A1A8 MISCELLANEOUS		
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0752	9	1	EXTR-PC BD YEL POLYC .062-BD-THKNS	28480	4040-0752
A1A9	08672-60046	4	1	MOD METERING BOARD ASSEMBLY	28480	08672-60046
A1A9C1	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C2	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C3	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C4	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C5	0180-2207	5	5	CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A1A9C6	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C7	0180-2207	5		CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A1A9C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1A9C9	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C10	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C11	0180-1746	5	4	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A1A9C12	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A1A9C13	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C14	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C15	0160-3875	3	2	CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A9C16	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C17	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A1A9C18	0160-2252	8	1	CAPACITOR-FXD 6.2PF +-.25PF 500VDC CER	28480	0160-2252
A1A9C19	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1A9C20	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A1A9C21	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C22	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A1A9C23	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C24	0180-2207	5		CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A1A9C25	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C26	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C27	0180-2206	4		CAPACITOR-FXD 60UF+-10% 6VDC TA	56289	150D606X9006B2
A1A9C28	0180-2206	4		CAPACITOR-FXD 60UF+-10% 6VDC TA	56289	150D606X9006B2
A1A9C29	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9C30	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A9C31	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A9CR1	1901-0535	9	6	DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9CR2	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR6	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR10				NOT ASSIGNED		
A1A9CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A9CR13	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9CR14	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9CR15	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A1A9Q1	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q2	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q3	1854-0610	0	5	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A9Q4	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A9Q5	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q6	1854-0019	3	2	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A1A9Q7	1854-0019	3		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A1A9Q8	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q9	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q10	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q11	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A9Q12	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A9Q13	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A9Q14	1854-0247	9	1	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A1A9Q15	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A9Q16	1853-0034	0		TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A1A9Q17	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A1A9R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A9R2	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A9R3	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A9R4	0757-0397	3	1	RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A1A9R5	0757-0797	7	1	RESISTOR 90.9 1% .5W F TC=0+-100	28480	0757-0797
A1A9R6	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1A9R7	0683-1055	5	1	RESISTOR 1M 5% .25W FC TC=-800/+900	01121	CB1055
A1A9R8	0698-7270	9	4	RESISTOR 26.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2612-F
A1A9R9	0698-7270	9		RESISTOR 26.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2612-F
A1A9R10	0698-7270	9		RESISTOR 26.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2612-F
A1A9R11	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R12	0757-0418	9	2	RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A1A9R13	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A1A9R14	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1A9R15	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A1A9R16	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1A9R17	0757-0389	3	1	RESISTOR 33.2 1% .125W F TC=0+-100	24546	C4-1/8-T0-33R2-F
A1A9R18	0698-4390	8	1	RESISTOR 66.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-66R5-F
A1A9R19	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A9R20	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A1A9R21	2100-2574	3	3	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A1A9R22	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A9R23	0698-7243	6	2	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A1A9R24	0698-7230	1		RESISTOR 562 1% .05W F TC=0+-100	24546	C3-1/8-T0-562R-F
A1A9R25				NOT ASSIGNED		

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A9R26	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A9R27	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R28				NOT ASSIGNED		
A1A9R29	0698-7288	9	6	RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A9R30	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A1A9R31	0698-7253	8	3	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A1A9R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A9R33	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A1A9R34	2100-2632	4	1	RESISTOR-TRMR 100 10% C SIDE-ADJ 1-TRN	30983	ET50X101
A1A9R35	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A1A9R36	0698-7224	3	3	RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A1A9R37	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A1A9R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R39	0698-7209	4	1	RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-T0-75R0-F
A1A9R40	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A1A9R41	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A1A9R42	0698-3443	0	1	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A1A9R43	0698-7205	0	4	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A1A9R44	0698-7238	9	1	RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A1A9R45	0757-0403	2		RESISTOR 121 1% .125W F TC=0+-100	24546	C4-1/8-T0-121R-F
A1A9R46	0698-7241	4	1	RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1621-F
A1A9R47	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A1A9R48	0757-0180	2	1	RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A1A9R49	0757-0378	0	1	RESISTOR 11 1% .125W F TC=0+-100	19701	MF4C1/8-T0-11R0-F
A1A9R50	0698-8690	9	1	RESISTOR 4.75 1% .125W F TC=0+-100	28480	0698-8690
A1A9R51	0757-0199	3	1	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A1A9R52	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1A9R53	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A1A9R54	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R55	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A1A9R56	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1A9R57	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A1A9R58	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A1A9R59	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A1A9R60	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R61	0698-7265	2	2	RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A1A9R62				NOT ASSIGNED		
A1A9R63	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A1A9R64	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A9R65	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A9R66	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A1A9R67	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A9R68	0698-7263	0	1	RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1332-F
A1A9R69	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A1A9R70	0698-7251	6	1	RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A1A9TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A9TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A9TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A9TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A9U1	1820-0919	1	1	IC COMPTR ECL A/D DUAL	04713	MC1650L
A1A9U2	1826-0256	1	1	IC COMPARATOR HS DUAL 14-DIP-P PKG	18324	NE522A
A1A9U3	1820-1374	4	2	IC SWITCH ANLG QUAD 16-DIP-P PKG	24355	AD7510DIJN
A1A9U4	1820-2015	2	2	IC GATE CMOS EXCL-OR QUAD	04713	MC14070BCP
A1A9U5	1820-1962	6	1	IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A1A9U6	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A1A9U7	1820-1374	4		IC SWITCH ANLG QUAD 16-DIP-P PKG	24355	AD7510DIJN
A1A9VR1	1902-3203	6	2	DIODE-ZNR 14.7V 5% DO-35 PD=.4W	28480	1902-3203
A1A9VR2	1902-0041	4		DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A1A9VR3	1902-3203	6		DIODE-ZNR 14.7V 5% DO-35 PD=.4W	28480	1902-3203
				A1A9 MISCELLANEOUS		
	1200-0173	5	1	INSULATOR-XSTR DAP-GL	28480	1200-0173
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0751	8	1	EXTR-PC BD ORN POLYC .062-BD-THKNS	28480	4040-0751
A1A10	08672-60047	5	1	ASSEMBLY, LEVEL CONTROL	28480	08672-60047
A1A10C1	0180-0141	2	1	CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D506G050DD2
A1A10C2	0180-1846	6	1	CAPACITOR-FXD 2.2UF+-10% 35VDC TA	56289	150D225X9035B2
A1A10C3	0180-0374	3	1	CAPACITOR-FXD 10UF+-10% 20VDC TA	56289	150D106X9020B2
A1A10C4	0180-0116	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A1A10C5	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A10C6	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A10C7	0160-0153	4	3	CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A1A10C8	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A10C9	0160-0153	4		CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A1A10C10	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2

See introduction to this section for ordering information
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Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A10C11	0160-0153	4		CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A1A10CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A10Q1	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q2	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A10Q3	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A10Q4	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A10Q5	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A10Q6	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q7	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q8	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q9	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q10	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A10Q11	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q12	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A1A10Q13	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A1A10Q14	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1A10Q15	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A10R1	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A10R2	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R3	0698-3154	0	1	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A1A10R4	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A1A10R5	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A1A10R6	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A1A10R7	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A1A10R8	0698-7262	9	1	RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1212-F
A1A10R9	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A10R10	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A10R11	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A10R12	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A10R13	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R14	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R16	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R17	0811-2505	5	1	RESISTOR 400K .025% .5W PWW TC=0+-5	14140	1251-1/8-C-4003-1/40
A1A10R18	0811-3140	6	1	RESISTOR 200K .1% .125W PWW TC=0+-10	20940	114-1/16-2003-B
A1A10R19	0811-0640	5	1	RESISTOR 100K .01% .125W PWW TC=0+-10	28480	0811-0640
A1A10R20	0811-0648	3	1	RESISTOR 50K .01% .125W PWW TC=0+-10	28480	0811-0648
A1A10R21	0811-0641	6	2	RESISTOR 10K 1% .125W PWW TC=0+-5	28480	0811-0641
A1A10R22	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A1A10R23	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A10R24	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A10R25	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A10R26	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A1A10R27	0811-2590	8	1	RESISTOR 1.333K 1% .125W PWW TC=0+-5	20940	135-1/8-C-1333R-F
A1A10R28	0811-0641	6		RESISTOR 10K 1% .125W PWW TC=0+-5	28480	0811-0641
A1A10R29	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A1A10R30	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A10R31	2100-3161	6	1	RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	02111	43P203
A1A10R32	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R33	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R34	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R35	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R36	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A1A10R37	0811-3365	7	1	RESISTOR 32.26K .5% .125W PWW TC=0+-2	28480	0811-3365
A1A10R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A1A10R39	0698-7270	9		RESISTOR 26.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2612-F
A1A10R40	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A10R41	0698-7277	6	5	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A1A10R42	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A1A10R43	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R44	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R45	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A10R46	0698-7265	2		RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A1A10R47	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A1A10R48	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A1A10R49	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A1A10R50	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A1A10R51	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A1A10U1	1820-0535	7	4	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A1A10U2	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A1A10U3	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1A10U4	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A1A10U5	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A1A10U6	1820-1976	2	3	IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A1A10U7	1826-0035	4	1	IC OP AMP LOW-DRIFT TO-99 PKG	27014	LM308AH
A1A10U8	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A10U9	1826-0059	2		IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A10VR1	1902-0680	7		DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A1A10VR2	1902-3245	6	1	DIODE-ZNR 21.5V 5% DO-35 PD=.4W	28480	1902-3245
				A1A10 MISCELLANEOUS		
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0750	7	1	EXTR-PC BD RED POLYC .062-BD-THKNS	28480	4040-0750
A1A11†	08672-60148	7	1	DIGITAL PROCESSOR ASSEMBLY	28480	08672-60148
A1A11C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A11CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1A11R1	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A1A11R2	1810-0277	3	1	NETWORK-RES 10-SIP2.2K OHM X 9	01121	210A222
A1A11R3	1810-0206	8	2	NETWORK-RES 8-SIP10.0K OHM X 7	01121	208A103
A1A11R4	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3 1/8-T0-1002-F
A1A11R5	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R6	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R7	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R8	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R9	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R10	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R11	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R12	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A11R13	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A11R14	1810-0206	8		NETWORK-RES 8-SIP10.0K OHM X 7	01121	208A103
A1A11R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R16	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R17	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R18	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R19	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R20	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R21	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R22	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R23	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R24	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A1A11R25	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A1A11R26	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A1A11R27†	0757-0280	3	13	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1A11TP1	0360-1730	9	8	CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP2	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP3	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP4	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP5	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP6	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP7	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730
A1A11TP8	0360-1730	9		CONNECTOR-SGL CONT PIN .058-IN-BSC-SZ	28480	0360-1730

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A11U1	1820-2085	6	5	IC GATE CMOS AND-OR QUAD	07263	4019BPC
A1A11U2	1820-2015	2		IC GATE CMOS EXCL-OR QUAD	04713	MC14070BCP
A1A11U3	1820-2085	6		IC GATE CMOS AND-OR QUAD	07263	4019BPC
A1A11U4	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A1A11U5	1820-2085	6		IC GATE CMOS AND-OR QUAD	07263	4019BPC
A1A11U6	1820-2085	6		IC GATE CMOS AND-OR QUAD	07263	4019BPC
A1A11U7	1820-1355	1	1	IC ENCDR CMOS 8-BIT	04713	MC14532BCP
A1A11U8†	08672-60018	0	1	PROM RANGE ENCODER	28480	08672-60018
A1A11U9	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A1A11U10	1820-2085	6		IC GATE CMOS AND-OR QUAD	07263	4019BPC
A1A11U11†	1820-1486	9	1	IC GATE CMOS AND QUAD 2-INP	3L585	CD4081BE
				A1A11 MISCELLANEOUS		
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-BD-THKNS	28480	4040-0749
A1A12†	08672-60118	1	1	POWER AMPLIFIER 100MW ASSEMBLY	28480	08672-60118
A1A13	08672-60049	7	1	INTERCONNECT ASSEMBLY	28480	08672-60049
A1A13C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A13C2	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A13J1	1200-0508	0	3	SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A1A13P1-A1A13P12				NOT ASSIGNED		
A1A13P13	1251-3806	4	1	CONNECTOR 50-PIN M D SERIES	28480	1251-3806
A1A13P14	1251-3421	9	1	CONNECTOR 24-PIN M D SERIES	28480	1251-3421
A1A13R1*	0757-0463	4	2	RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8252-F
A1A13R2	0757-0794	4	1	RESISTOR 68.1 1% .5W F TC=0+-100	28480	0757-0794
A1A13R3	0757-0198	2	1	RESISTOR 100 1% .5W F TC=0+-100	28480	0757-0198
A1A13R4	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
				A1A13 MISCELLANEOUS		
	0380-0334	9	4	STANDOFF-RVT-ON .375-IN-LG 4-40THD	00000	ORDER BY DESCRIPTION
	0380-0730	9	4	STANDOFF-RVT-ON .188-IN-LG 4-40THD	28480	0380-0730
	1251-3172	7	5	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	28480	1251-3172
A1A13A1				PRE-AMPLIFIER ASSEMBLY (NSR)		
A1A14†	08672-60178	3	1	MOTHER BOARD ASSEMBLY	28480	08672-60178
A1A14C1	0180-0183	2	1	CAPACITOR-FXD 10UF+75-10% 50VDC AL	56289	30D106G050CD2
A1A14C2				NOT ASSIGNED		
A1A14C3	0180-2207	5		CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A1A14C4	0180-2207	5		CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A1A14J1-A1A14J7				NOT ASSIGNED		
A1A14J8	1251-3905	4	1	CONNECTOR 20-PIN M RECTANGULAR	28480	1251-3905
A1A14J9	1251-4433	5	1	CONNECTOR 34-PIN M PRINTED CIRCUIT	28480	1251-4433
A1A14J10						
A1A14J11	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A1A14J12	1250-0257	1	6	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14J13	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14J14	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14J15	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14J16	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14J17	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A1A14Q1	1853-0344	5	1	TRANSISTOR PNP 2N5876 SI TO-3 PD=150W	04713	2N5876
A1A14R1	0811-3409	0	1	RESISTOR 40 1% 12W PW TC=0+-2	28480	0811-3409
A1A14XA1-A1A14XA4				NOT ASSIGNED		
A1A14XA5	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA6	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA7	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA8	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA9	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA10				NOT ASSIGNED		
A1A14XA11A	1251-2026	8	7	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA11B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A1A14XA12				NOT ASSIGNED		
A1A14XA13	1251-1365	6	1	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A1A14 MISCELLANEOUS		
	1251-3052	2	1	CONN STRIP: 11PIN;M;1 GUIDE PIN	9D949	221-69
	03431-01201	8	1	FOOT	28480	03431-01201
	1251-3172	7		CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	28480	1251-3172

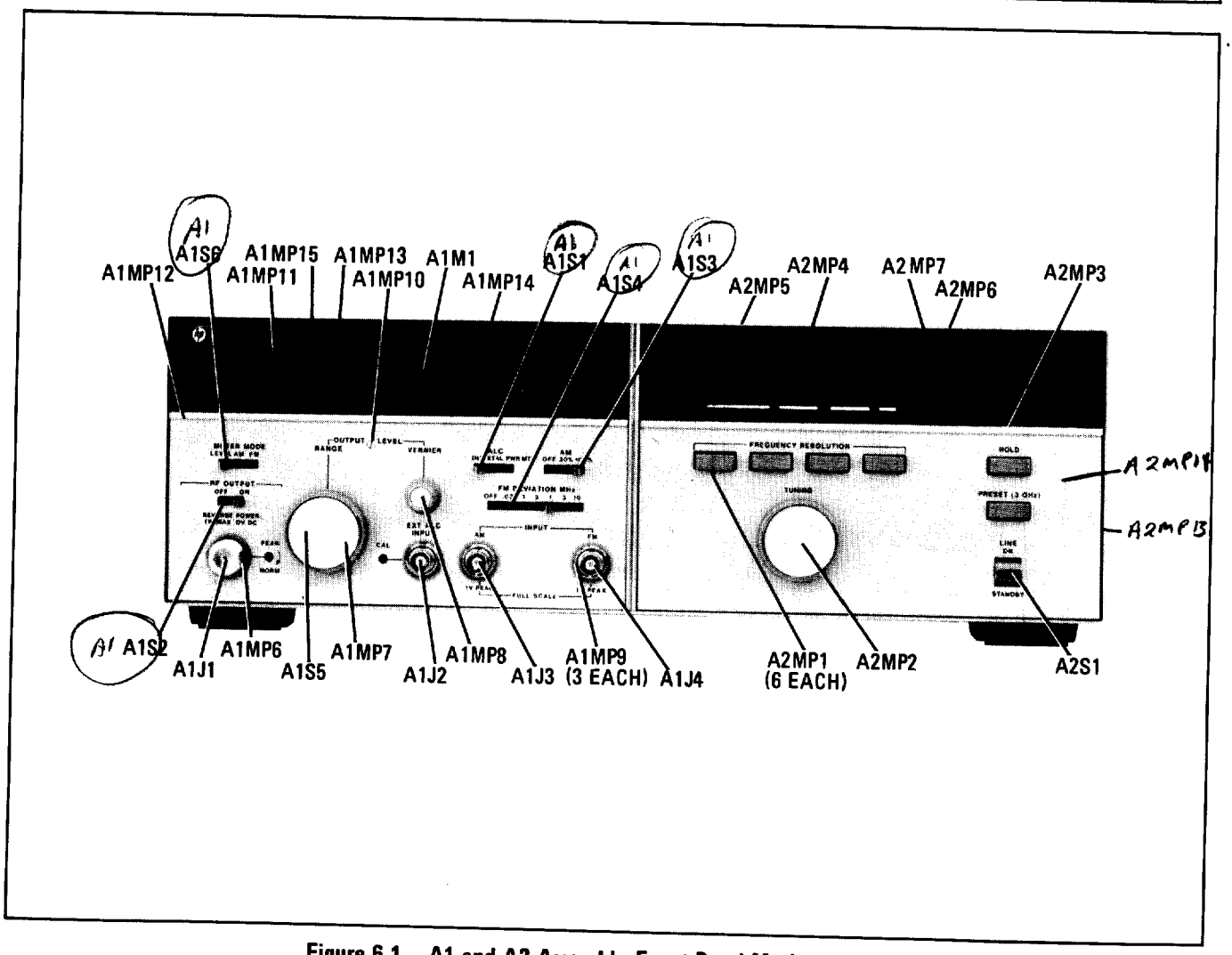


Figure 6-1. A1 and A2 Assembly Front Panel Mechanical Parts

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A1 CHASSIS PARTS		
A1AT1	08672-60114	7	1	PROGRAMMABLE ATTENUATOR, 110 DB (EXCEPT OPTIONS 001,005,034 AND 038)	28480	08672-60114
A1AT1	08672-60111	4		PROGRAMMABLE ATTENUATOR (RESTORED 08672-60114)	28480	08672-60111
A1AT2	0960-0362	3	1	ISOLATOR	28480	0960-0362
A1AT3	08672-60112	5	1	PIN MODULATOR	28480	08672-60112
A1CR1	08672-60129	4	1	LEVELING DETECTOR (OPTION 003)	28480	08672-60129
A1DC1	0955-0101	7	1	DIRECTIONAL COUPLER	28480	0955-0101
A1DS1	1990-0399	0	1	DISPLAY-AN-DOT MAT 1-CHAR .135-H	28480	5082-7304
A1DS2†	1990-0686	8	2	DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G
A1DS3†	1990-0686	8		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G
A1FL1	08672-60093	1	1	HIGH PASS FILTER	28480	08672-60093
A1J1†	08672-60132	9	1	CONNECTOR-RF OUTPUT (DOES NOT INCLUDE HEX NUT OR LOCK WASHER)	28480	08672-60132
	2950-0079	0	1	HEX NUT	28480	2950-0079
	2190-0120	0	1	LOCK WASHER	28480	2190-0120
A1J2	1250-0872	6		(P/O A1W12; SEE A1MP1 THRU 5)	28480	1250-0872
A1J3	1250-0872	6		(P/O A1W17; SEE A1MP1 THRU 5)	28480	1250-0872
A1J4	1250-0872	6		(P/O A1W18; SEE A1MP1 THRU 5)	28480	1250-0872
A1M1	1120-0585	3	1	METER 2.50-IN; 1 MA FSD; TAUT BAND; LIN	28480	1120-0585
A1MP1	1250-0952	3	3	CONTACT-RF CONN BNC/TNC:FEM CTR (PART OF A1J2-4)	24931	C232-2
A1MP2	1250-0958	9	3	BUSHING RF CONN BNC/TNC: FOR INTL (PART OF A1J2-4)	24931	CS 105-3
A1MP3	1250-0960	3	3	SLEEVE-RF CONN SER BNC/TNC (PART OF A1J2-4)	28480	1250-0960
A1MP4	1250-0964	7	3	NUT-RF CONN BNC/TNC: CLAMP NUT FOR (PART OF A1J2-4)	24931	N126-2
A1MP5	1250-1091	3	3	CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM (PART OF A1J2-4)	28480	1250-1091
A1MP6	08731-210	2	1	NUT, LOCK	28480	08731-210
A1MP7	0370-2389	7	1	KNOB-BASE 1-1/2 JGK .25-IN-ID	28480	0370-2389
A1MP8	0370-0584	0	1	KNOB-BASE 1/2 JGK .25-IN-ID	28480	0370-0584
A1MP9	0590-1011	6	1	NUT-KNRLD-R 15/32-32-THD .12-IN-THK	28480	0590-1011
A1MP10	08640-40044	2	1	SCREW, METER ZERO	28480	08640-40044
A1MP11	08672-20077	7	1	WINDOW, RF	28480	08672-20077
A1MP12	5040-6927	3	1	DIVIDER STRIP	28480	5040-6927
A1MP13	1460-0553	5	4	STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
A1MP14	1460-0553	5		STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
A1MP15	08672-00064	0	1	SHIELD RFI	28480	08672-00064
A1MP16	00310-48801	0		WASHER, SHOULDERED	28480	00310-48801
A1R1	2100-3840	8	1	RESISTOR-VAR CONTROL CP 10K 10% LIN	28480	2100-3840
A1R2	2100-2590	3	1	RESISTOR-VAR CONTROL CCP 10K 10% 10CW	28480	2100-2590
A1R3	2100-3530	3	1	RESISTOR-VAR W/SW 10K 20% LIN SPST-NO	28480	2100-3530
A1S1	08672-60075	9	2	SLIDE SWITCH ASSEMBLY, 1.C. (ALC MODE)	28480	08672-60075
	5020-3440	7	5	SPRING:DETENT	28480	5020-3440
A1S2	08672-60077	1	1	SLIDE SWITCH,(RF)	28480	08672-60077
	5020-3440	7		SPRING:DETENT	28480	5020-3440
A1S3	08672-60076	0	2	SLIDE SWITCH ASSEMBLY, 2.C.(AM FUNCTION)	28480	08672-60076
	5020-3440	7		SPRING:DETENT	28480	5020-3440
A1S4	08672-60076	0		SLIDE SWITCH ASSEMBLY, 2.C.(FM DEVIATION	28480	08672-60076
	5020-3440	7		SPRING:DETENT	28480	5020-3440
A1S5	3130-0517	4	1	SHAFT & INDEX ASSY-RANGE,13POS-22DEG (EXCEPT OPT. 001 AND 005)	28480	3130-0517
A1S5	3130-0537	8	1	SHAFT AND INDEX ASSY-RANGE-2 POS-22 DEG (OPT 001/005 ONLY)	28480	3130-0537
	5001-0383	1	2	CONTACT, PC,ROTARY SWITCH(OUTPUT LEVEL RANGE)	28480	5001-0383
	5040-6948	8	1	INSULATOR, PC, ROTARY SWITCH, MALE	28480	5040-6948
	5040-6949	9	1	INSULATOR,PC, ROTARY SWITCH, FEMALE	28480	5040-6949
	5001-0157	7	1	SPRING, PC, ROTARY SWITCH (OPTION 001 AND 005 ONLY)	28480	5001-0157
A1S6	08672-60075	9		SLIDE SWITCH ASSEMBLY, 2.C.(METER MODE)	28480	08672-60075
	5020-3440	7		SPRING:DETENT	28480	5020-3440
A1W1	08672-20070	0	1	CABLE, RF INPUT	28480	08672-20070
A1W2	08672-20072	2	1	CABLE, MOD IN	28480	08672-20072
A1W3	08672-20073	3	1	CABLE, MOD OUTPUT	28480	08672-20073
A1W4	08672-20068	6	1	CABLE, ISOLATOR INPUT	28480	08672-20068
A1W5	08672-20067	5	1	CABLE ASSEMBLY, YIG INPUT	28480	08672-20067

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1W6	08672-20066	4	1	CABLE ASSEMBLY, YIG OUTPUT	28480	08672-20066
A1W7	08672-20065	3	1	CABLE ASSEMBLY,DIRECTIONAL COUPLER OUTPUT (EXCEPT OPTIONS 001,005,034,038)	28480	08672-20065
A1W8†	08672-20130	3	1	CABLE, RF OUTPUT, EXCEPT OPTIONS 001, 004,005,034,038(DOES NOT INCLUDE A1J1).	28480	08672-20130
A1W8†	08672-20131	4	1	CABLE, RF OUTPUT, OPTIONS 001,034,038 (DOES NOT INCLUDE A1J1).	28480	08672-20131
A1W8†	08672-20185	8	1	CABLE, RF OUTPUT, OPTION 004 ONLY (DOES NOT INCLUDE A3J6).	28480	08672-20185
A1W8	8120-2474	0	1	CABLE, RF OUTPUT, OPTION 005 ONLY (INCLUDES A3J6).	28480	8120-2474
A1W9	08672-60065	7	1	CABLE ASSEMBLY, ALC	28480	08672-60065
	1250-0872	6	4	CONNECTOR-RF SMB FEM UNMTD 50-OHM	28480	1250-0872
	1250-1167	4	1	CONNECTOR-RF SMC FEM UNMTD 50-OHM	28480	1250-1167
	1250-1174	3	1	COVER-RF CONN 50 OHM SUBMINIATORE	98291	5561-27
	1250-1175	4	1	SLEEVE-RF CONN 0.150IN OD: 0.122 IN	98291	6100-42
	8120-1111	0	1	CABLE-COAX 50-OHM 1KV BLU	28480	8120-1111
A1W10†	08672-60071	5	2	CABLE, 14-CONDUCTOR	28480	08672-60071
	1251-2499	9	4	CONNECTOR 14-PIN M RECTANGULAR	28480	1251-2499
	8120-1458	8	4	CABLE-FL-RBN 28AWG 14-CNDCT GRA-INSUL	28480	8120-1458
A1W11	08672-60071	5		CABLE, 14-CONDUCTOR	28480	08672-60071
	1251-2499	9		CONNECTOR 14-PIN M RECTANGULAR	28480	1251-2499
	8120-1458	8		CABLE-FL-RBN 28AWG 14-CNDCT GRA-INSUL	28480	8120-1458
A1W12	08672-60063	5	1	CABLE ASSEMBLY,ALC INPT(YELLOW;INCL A1J2	28480	08672-60063
A1W13				NOT ASSIGNED		
A1W14	08672-60073	7	1	CABLE ASSEMBLY, ATTENUATOR DRIVER (EXCEPT OPTIONS 001,005,034 AND 038)	28480	08672-60073
	1251-1249	5	1	POLARIZING KEY-PC EDGE CONN	28480	1251-1249
	1251-1313	4	1	CONTACT-CONN U/W-MICRO FEM CRP	28480	1251-1313
	1251-3053	3	1	CONTACT-STRIP, 12POS,ATTACHED STRAIN RLF	28480	1251-3053
	8120-2178	1	1	CABLE ASSY 22AWG 9-CNDCT GRA-JKT	28480	8120-2178
A1W15	08672-60091	9	1	CABLE ASSEMBLY, 34-CONDUCTOR	28480	08672-60091
A1W16	08672-60057	7	1	CABLE ASSEMBLY, 20-CONDUCTOR	28480	08672-60057
A1W17	08672-60062	4	1	CABLE ASSY, AM INPUT,ORANGE(INCL. A1J3)	28480	08672-60062
A1W18	08672-60060	2	1	CABLE ASSEMBLY, FM INPUT(BROWN;INCL A1J4	28480	08672-60060
A1W19	08672-60180	7	1	CABLE ASSEMBLY,ATTENUATOR DRIVER (OPTIONS 034,038)	28480	08672-60180
	0510-0569	9		RETAINER-RING BSC EXT .5-IN-DIA SST	28480	0510-0569
	1400-0053	4	2	CLAMP-CABLE .172-DIA .375-WD NYL	28480	1400-0053
	2360-0199	4	2	SCREW-MACH 6-32 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	3050-0066	8	2	WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0066
	2190-0018	5	2	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
				A1 MISCELLANEOUS		
	1200-0043	8	1	INSULATOR-XSTR ALUMINUM	28480	1200-0043
	1200-0081	4	2	INSULATOR-FLG-BSHG NYLON	28480	1200-0081
	1251-4459	5	1	CLIP-CABLE PLUG RTNG-DUAL INLINE 14 CONT	28480	1251-4459
	1400-0054	5	1	CLAMP-CABLE .078-DIA .375-WD STL (ALTERNATE FOR 1400-0082)	28480	1400-0054
	1400-0082	9	1	CLAMP-CABLE .125-DIA .375-WD NYL (ALTERNATE FOR 1400-0054)	28480	1400-0082
	5020-0446	7	1	NUT:HEX (OPTION 001 ONLY)	28480	5020-0446
	08672-00026	4	1	SUPPORT, REAR	28480	08672-00026
	08672-00075	3	1	CONNECTOR SUPPORT	28480	08672-00075
	08672-00028	6	1	SUPPORT, P.C. FRONT	28480	08672-00028
	08672-00029	7	1	SUPPORT, P.C. REAR	28480	08672-00029
	08672-00031	1	1	SUPPORT, ATTENUATOR	28480	08672-00031
	08672-00032	2	1	SHIELD, ALC BOARD	28480	08672-00032
	08672-00038	8	1	GUSSET, HINGE PLATE	28480	08672-00038
	08672-00039	9	1	DECK, MAIN	28480	08672-00039
	08672-00040	2	1	GUSSET	28480	08672-00040
	08672-00042	4	1	SPACER, MICROCIRCUIT	28480	08672-00042
	08672-00048	0	1	BAR, UPPER TIE	28480	08672-00048
	08672-00049	1	1	HEAT SINK, BRACKET, AMPLIFIER	28480	08672-00049
	3050-0161	4	1	WASHER-SPR WAVY 1/4 IN .265-IN-ID	28480	3050-0161
	00310-48801	0	12	WASHER, SHOULDERED	28480	00310-48801
	08672-00034	4	1	SUPPORT, POT	28480	08672-00034
	08672-00035	5	1	SPACER, METER	28480	08672-00035
	08672-00037	7	1	PANEL, SUB-RF	28480	08672-00037
	08672-00047	9	1	PANEL, RF(EXCEPT OPTIONS 004 AND 005)	28480	08672-00047
	08672-00051	5	1	PANEL, RF (OPTIONS 004 & 005 ONLY)	28480	08672-00051
	08672-00050	4	2	CLAMP, METER	28480	08672-00050
	08672-20037	9	2	SUPPORT, FRONT PANEL	28480	08672-20037
	08672-20056	2	1	PAD, LED	28480	08672-20056
	08672-20057	3	1	HEAT SINK, LED	28480	08672-20057
	08672-40006	4	5	LAMP, HOUSING, LONG	28480	08672-40006

See introduction to this section for ordering information
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†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
	08672-40007	5	10	LAMP, HOUSING, SHORT	28480	08672-40007
	08672-40008	6	5	BAR, LIGHT, LONG	28480	08672-40008
	08672-40009	7	10	BAR, LIGHT, SHORT	28480	08672-40009
	08672-40010	0	15	PLUG, LIGHT	28480	08672-40010
	08672-20083	5	1	BUSHING PANEL	28480	08672-20083
	08672-00065	1	1	AIR DEFLECTOR	28480	08672-00065
	08672-20112	1	1	SHIELD, ISOLATOR	28480	08672-20112
	08672-20113	2	1	SHIELD, ATTENUATOR (EXCEPT OPT 001 AND 005)	28480	08672-20113
	08672-00061	7	1	SHIELD, ISOLATOR	28480	08672-00061
	08672-00062	8	1	SUPPORT, MODULATOR	28480	08672-00062
	08672-00068	4	1	LABEL, I.D.	28480	08672-00068
	08672-20118	7	1	BUSHING,PLASTIC(EXCEPT OPT 004 & 005)	28480	08672-20118
	9170-0029	3	1	CORE-SHIELDING BEAD	28480	9170-0029

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2				CONTROLLER ASSEMBLY		
A2A1	08672-60100	1	1	ASSEMBLY, FRONT PANEL(SUPPLIED SEPARATELY 08672-20032,08672-20035,08672-20036 08672-20037,08672-40001 & 08672-40002)	28480	08672-60100
A2A1C1†	0180-0229	7	6	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A1C2†	0160-0573	2	2	CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A2A1C3	0160-3878	6	7	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A1C4	0160-0572	1	4	CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A2A1C5	0160-3877	5	24	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C6	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C7	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C8	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A1C9	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A1C10	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A1C11	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A1C12	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A1CR1	1901-0040	1	26	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A1CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A1CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A1DS1	2140-0253	5	2	LAMP-INCAND 6839 28VDC 24MA T-1-BULB	1F556	6839
A2A1DS2	2140-0092	0	8	LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS3	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS4	2140-0253	5		LAMP-INCAND 6839 28VDC 24MA T-1-BULB	1F556	6839
A2A1DS5	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS6	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS7	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS8	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS9	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1DS10	2140-0092	0		LAMP-INCAND 685 5VDC 60MA T-1-BULB	00115	685 TIP END
A2A1J1	1251-3024	8	2	CONNECTOR 26-PIN M RECTANGULAR	28480	1251-3024
A2A1J2A				(INCLUDES A2A1MP1 (16 EACH)		
A2A1J2B				(INCLUDES A2A1MP1 (24 EACH)		
A2A1J2C				(INCLUDES A2A1MP1 (24 EACH)		
A2A1MP1	1200-0448	7	64	SOCKET-IC 1-CONT DIP-SLDR (PART OF A2A1J2A,B,C)	28480	1200-0448
A2A1Q1	1854-0071	7	17	TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q2	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q5	1853-0020	4	10	TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A1Q6	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q7	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1Q8	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A1R1	0698-7253	8	11	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R2	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R3	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R5	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R6				NOT ASSIGNED		
A2A1R7				NOT ASSIGNED		
A2A1R8				NOT ASSIGNED		
A2A1R9				NOT ASSIGNED		
A2A1R10	0698-7277	6	3	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A2A1R11	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R12	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A2A1R13	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A2A1R14	0698-7264	1	1	RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A2A1R15	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R16	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R17	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R18	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R19	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A2A1R20	0698-7268	5	2	RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A1R21	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A1R22	0698-7236	7	6	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R23	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R24	0698-7244	7	2	RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A2A1R25†	0698-7254	9	1	RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5621-F
A2A1R26	0698-7260	7	3	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A1R27	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A1R28	0698-7269	6	1	RESISTOR 23.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2372-F
A2A1R29	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A2A1R30	0698-7273	2	1	RESISTOR 34.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3482-F

See introduction to this section for ordering information
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Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A1R31	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A1R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R33	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R34	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R35	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A1R36	0698-7212	9	1	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A2A1S1	3101-0624	3	6	SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1S2	3101-0624	3		SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1S3	3101-0624	3		SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1S4	3101-0624	3		SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1S5	3101-0624	3		SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1S6	3101-0624	3		SWITCH-SENS SPDT-DB SUBMIN 4A 250VAC	28480	3101-0624
A2A1U1	1820-2085	6	1	IC GATE CMOS AND-OR QUAD	07263	4019BPC
A2A1U2	1820-1197	9	8	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A1U3	1820-1433	6	2	IC SHF-RGTR TTL LS R-S SERIAL-IN PRL-OUT	01295	SN74LS164N
A2A1U4	1820-1433	6		IC SHF-RGTR TTL LS R-S SERIAL-IN PRL-OUT	01295	SN74LS164N
A2A1U5	1820-2080	1	27	IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A1U6	1820-2079	8	2	IC GATE CMOS NOR DUAL 4-INP	04713	MC14002BCP
A2A1U7	1826-0026	3	1	IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A2A1U8	1820-1199	1	4	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A1U9	1820-2031	2	1	IC SHF-RGTR CMOS ASYNCHRO PRL-IN	3L585	CD4021BE
A2A1XA2DS1	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7	10	EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS2	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS3	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS4	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS5	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS6	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS7	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS8	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
A2A1XA2DS9	86290-00034	6		LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
	86290-00034	6	10	LAMP, CONTACT	28480	86290-00034
	0361-0457	7		EYELET-RLD-FLG .065-OD .125-LG .008-THK	07707	S-5994
				A2A1 MISCELLANEOUS		
	1251-0600	0	23	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2	5060-0329	9	1	GENERATOR, ROTARY PULSE	28480	5060-0329
A2A3†	08672-60143	2	1	ASSEMBLY, VCO, 160-240 MHZ	28480	08672-60143
A2A3C1	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C2	0160-0166	9	5	CAPACITOR-FXD .068UF +-10% 200VDC POLYE	28480	0160-0166
A2A3C3	0160-3879	7	8	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A3C4	0180-0116	1	2	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A2A3C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A3C6	0160-2259	5	1	CAPACITOR-FXD 12PF +-5% 500VDC CER 0+-30	28480	0160-2259
A2A3C7	0160-0301	4	2	CAPACITOR-FXD .012UF +-10% 200VDC POLYE	28480	0160-0301
A2A3C8	0160-0166	9		CAPACITOR-FXD .068UF +-10% 200VDC POLYE	28480	0160-0166
A2A3C9	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C10	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C11	0160-0301	4		CAPACITOR-FXD .012UF +-10% 200VDC POLYE	28480	0160-0301
A2A3C12†	0160-3456	6	21	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C13	0180-2211	1	1	CAPACITOR-FXD 5UF+50-10% 150VDC AL	56289	30D505F150CC2
A2A3C14	0180-2214	4	1	CAPACITOR-FXD 90UF+75-10% 16VDC AL	56289	30D906G016CC2
A2A3C15	0160-0166	9		CAPACITOR-FXD .068UF +-10% 200VDC POLYE	28480	0160-0166
A2A3C16	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C17	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C18	0160-3466	8	2	CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A2A3C19	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C20	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C21	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C22	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C23	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C24	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C25	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A3C26	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C27	0160-2240	4	1	CAPACITOR-FXD 2PF +-.25PF 500VDC CER	28480	0160-2240
A2A3C28	0160-2262	0	2	CAPACITOR-FXD 16PF +-5% 500VDC CER 0+-30	28480	0160-2262
A2A3C29	0160-2262	0		CAPACITOR-FXD 16PF +-5% 500VDC CER 0+-30	28480	0160-2262
A2A3C30	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C31	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A3C32	0140-0195	2	2	CAPACITOR-FXD 130PF +-5% 300VDC MICA	72136	DM15F131J0300WV1CR
A2A3C33	0140-0195	2		CAPACITOR-FXD 130PF +-5% 300VDC MICA	72136	DM15F131J0300WV1CR
A2A3CR1	0122-0085	1	4	DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5	28480	0122-0085
A2A3CR2	0122-0085	1		DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5	28480	0122-0085
A2A3CR3	0122-0085	1		DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5	28480	0122-0085
A2A3CR4	0122-0085	1		DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5	28480	0122-0085
A2A3J1	1250-0544	9	3	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A2A3J2	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A2A3L1	9140-0180	4	1	INDUCTOR RF-CH-MLD 2.7UH 10%	28480	9140-0180
A2A3L2	9100-2583	1	2	INDUCTOR RF-CH-MLD 6.8MH 10%	28480	9100-2583
A2A3L3	9100-2583	1		INDUCTOR RF-CH-MLD 6.8MH 10%	28480	9100-2583
A2A3L4	9100-2249	6	1	INDUCTOR RF-CH-MLD 150NH 10% .105DX.26LG	28480	9100-2249
A2A3L5	9100-2891	4	1	INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A2A3L6	9100-2248	5	2	INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A2A3L7	9100-2254	3	1	INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A2A3L8	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A2A3MP1†	08672-20135	8	1	VCO COVER	28480	08672-20135
A2A3Q1	1855-0392	7	1	TRANSISTOR J-FET N-CHAN D-MODE TO-72 SI	28480	1855-0392
A2A3Q2	1854-0345	8	3	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q5	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A3Q6	1853-0451	5	1	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A2A3R1	0757-0199	3	57	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A3R2	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A3R3	0698-3156	2	2	RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A2A3R4	0757-0834	3	1	RESISTOR 5.62K 1% .5W F TC=0+-100	28480	0757-0834
A2A3R5	0757-0279	0	6	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A3R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A3R7	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A3R8	0757-0278	9	4	RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A2A3R9	0757-0346	2	4	RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A2A3R10	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A3R11	0698-3444	1	12	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A3R12	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A3R13	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A2A3R14	0757-0180	2	1	RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A2A3R15	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A3R16	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A2A3R17	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A3R18	0698-3440	7	2	RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A2A3R19	0757-0428	1	1	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A2A3R20	0698-3160	8	4	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A2A3R21	0698-3452	1	2	RESISTOR 147K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1473-F
A2A3R22	0757-0123	3	1	RESISTOR 34.8K 1% .125W F TC=0+-100	28480	0757-0123
A2A3R23	0757-0416	7	3	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A2A3R24	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A2A3R25	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A3R26	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A2A3R27	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A2A3R28	0757-0418	9	4	RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A2A3R29	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A3R30	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A2A3R31	0698-0083	8	24	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A3R32	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A3R33	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A3R34†	0757-0401	0	5	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A3S1	3101-1524	4	1	SWITCH-SL DP3T SUBMIN .5A 125VAC/DC PC	28480	3101-1524
A2A3T1	08672-80003	5	1	COIL, INDUCTOR	28480	08672-80003
A2A3U1	1820-1225	4	1	IC FF ECL D-M/S DUAL	04713	MC10231P
A2A3U2	1820-0794	0	1	IC FF ECL D-M/S	04713	MC1670L
				A2A3 MISCELLANEOUS		
	86701-40001	9	6	EXTRACTOR, P.C. BOARD	28480	86701-40001

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A4†	08672-60144	3	1	ASSEMBLY, 20/30 PHASE DETECTOR	28480	08672-60144
A2A4C1	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A2A4C2	0160-0162	5	1	CAPACITOR-FXD .022UF +-10% 200VDC POLYE	28480	0160-0162
A2A4C3	0180-0197	8	18	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A4C4	0180-0141	2	1	CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D506G050DD2
A2A4C5	0160-3459	9	4	CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3459
A2A4C6	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A4C7	0160-0161	4	2	CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A2A4C8	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A2A4C9	0160-2290	4	2	CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A2A4C10	0160-2205	1	1	CAPACITOR-FXD 120PF +-5% 300VDC MICA	28480	0160-2205
A2A4C11	0160-3459	9		CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3459
A2A4C12	0160-2290	4		CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A2A4C13	0160-2207	3	1	CAPACITOR-FXD 300PF +-5% 300VDC MICA	28480	0160-2207
A2A4C14	0160-3459	9		CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3459
A2A4C15	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A2A4C16	0160-2055	9	13	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A4C17	0160-3459	9		CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3459
A2A4C18	0170-0040	9	1	CAPACITOR-FXD .047UF +-10% 200VDC POLYE	56289	292P47392
A2A4C19	0160-0166	9		CAPACITOR-FXD .068UF +-10% 200VDC POLYE	28480	0160-0166
A2A4C20	0160-3661	5	2	CAPACITOR-FXD .1UF +-5% 50VDC MET-POLYC	28480	0160-3661
A2A4C21	0160-0166	9		CAPACITOR-FXD .068UF +-10% 200VDC POLYE	28480	0160-0166
A2A4C22	0160-3661	5		CAPACITOR-FXD .1UF +-5% 50VDC MET-POLYC	28480	0160-3661
A2A4CR1	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR2	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR3	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR4	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4L1	9100-1629	4	2	INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A2A4L2	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A2A4L3	08672-80002	4	2	INDUCTOR, 3.8 MH	28480	08672-80002
A2A4L4	08672-80002	4		INDUCTOR, 3.8 MH	28480	08672-80002
A2A4MP1†	08672-20136	9	1	COVER, PHASE DETECTOR	28480	08672-20136
A2A4Q1	1854-0475	5	1	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A2A4Q2	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A4R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R2	0698-3629	4	1	RESISTOR 270 5% 2W MO TC=0+-200	28480	0698-3629
A2A4R3	0757-1094	9	1	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A2A4R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R5	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R7	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R8	0757-0440	7	2	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A2A4R9	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R10	0757-0438	3	28	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A4R11	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A2A4R12	0757-0422	5	4	RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A2A4R13	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A2A4R14	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A4R15	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A2A4R16	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A4R17	0757-0462	3	2	RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7502-F
A2A4R18	0757-0458	7	14	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A4R19	0757-0462	3		RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7502-F
A2A4R20	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A4R21	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A4R22	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R23†	0757-0819	4	1	RESISTOR 909 1% .5W F TC=0+-100	28480	0757-0819
A2A4R24	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A4R25	0757-0424	7	1	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A2A4R26	0698-3443	0	1	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A2A4R27	0698-3153	9	1	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A2A4R28	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A2A4R29	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A2A4R30	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A2A4R31	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A2A4R32†	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4U1	1820-0429	8	2	IC V RGLTR TO-39	18324	LM309H
A2A4U2	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A4U3	1820-0201	0	1	IC FF TTL J-K M/S PULSE CLEAR DUAL	01295	SN74107N
A2A4U4	1820-0846	3	1	IC BFR TTL NON-INV QUAD 1-INP	27014	DM8094N
A2A4U5	1820-0223	0	1	IC OP AMP GP TO-99 PKG	3L585	CA301AT

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A4U6	1820-1422	3	2	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U7	1820-1422	3		IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U8	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A4VR1	1902-3234	3	1	DIODE-ZNR 19.6V 5% DO-35 PD=.4W	28480	1902-3234
				A2A4 MISCELLANEOUS		
	1205-0250	9	2	THERMAL LINK SGL TO-5/TO-39-CS	28480	1205-0250
	86701-40001	9		EXTRACTOR	28480	86701-40001
A2A5†	08672-60145	4	1	ASSEMBLY, 20/30 DIVIDER	28480	08672-60145
A2A5C1	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C2	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5C3	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5C4	0180-2205	3	1	CAPACITOR-FXD .33UF+-10% 35VDC TA	56289	150D334X9035A2
A2A5C5	0160-3466	8		CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A2A5C6	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C7	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5C8	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A5C9	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C10	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C11	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C12	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C13	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C14	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C15	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C16	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C17	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C18	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C19	0160-3537	4	1	CAPACITOR-FXD 680PF +-5% 100VDC MICA	28480	0160-3537
A2A5C20	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A5J1	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A2A5L1	9100-4078	3	6	INDUCTOR-TOROID	28480	9100-4078
A2A5L2	9100-1618	1	1	INDUCTOR RF-CH-MLD 5.6UH 10%	28480	9100-1618
A2A5L3	9100-4078	3		INDUCTOR-TOROID	28480	9100-4078
A2A5MP1†	08672-20134	7	1	COVER, DIVIDER	28480	08672-20134
A2A5Q1	1854-0019	3	2	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A2A5R1	0698-3628	3	1	RESISTOR 220 5% 2W MO TC=0+-200	28480	0698-3628
A2A5R2	0757-0397	3	1	RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A2A5R3	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A5R4	2100-2413	9	1	RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	30983	ET50X201
A2A5R5	0698-7216	3	16	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R6	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R7	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R8	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R9	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R10	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R11	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A5R12	0698-3150	6	1	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A2A5R13	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A5R14	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R15	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A5R16	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R17	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R18	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R19	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R20	0698-3157	3	1	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A2A5R21	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R22	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R23	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R24	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R25	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R26	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R27	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R28	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R29	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A2A5R30	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A2A5R31	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A2A5R32	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R34	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R35	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A5R36	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5R37	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A2A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A5U1	1820-1251	6	5	IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U2	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U3	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U4	1820-0261	6	1	IC MV TTL MONOSTBL	01295	SN74121N
A2A5U5	1820-0686	9	1	IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A2A5U6	1820-0629	0	2	IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A2A5U7	1820-0629	0		IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A2A5U8	1820-1384	6	1	IC PRESCR ECL	52648	SP8641B
A2A5U9	1820-0429	8		IC V RGLTR TO-39	18324	LM309H
A2A5U10	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U11	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U12	1820-0909	9	1	IC MULTR TTL	01295	SN74167N
A2A5U13	1820-0751	9	2	IC CNTR TTL DECD NEG-EDGE-TRIG PRESET	01295	SN74196N
A2A5U14	1820-0751	9		IC CNTR TTL DECD NEG-EDGE-TRIG PRESET	01295	SN74196N
A2A5U15	1820-0685	8	1	IC GATE TTL S NAND TPL 3-INP	01295	SN74S10N
A2A5U16	1820-0690	5	1	IC BFR TTL S NAND DUAL 4-INP	01295	SN74S40N
				A2A5 MISCELLANEOUS		
	1205-0250	9		THERMAL LINK SGL TO-5/TO-39-CS	28480	1205-0250
	86701-40001	9		EXTRACTOR, P.C. BOARD	28480	86701-40001
	3050-0079	3	14	WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2	8	TACK-RUBBER	28480	10534-4001
A2A6	08672-60014	6	1	ASSEMBLY, INTERCONNECT	28480	08672-60014
A2A6J1	1251-3495	7	1	CONNECTOR 50-PIN M D SERIES	28480	1251-3495
A2A6J2	1251-3025	9	1	CONNECTOR 34-PIN M RECTANGULAR	28480	1251-3025
A2A7	08672-60009	9	1	ASSEMBLY, INTERFACE	28480	08672-60009
A2A7C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A7C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A7C3	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A7C4	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A7C5	0180-0218	4	1	CAPACITOR-FXD .15UF+-10% 35VDC TA	56289	150D154X9035A2
A2A7C6	0180-0376	5	2	CAPACITOR-FXD .47UF+-10% 35VDC TA	56289	150D474X9035A2
A2A7C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A7C8	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A2A7C9	0180-1745	4	1	CAPACITOR-FXD 1.5UF+-10% 20VDC TA	56289	150D155X9020A2
A2A7C10	0180-0376	5		CAPACITOR-FXD .47UF+-10% 35VDC TA	56289	150D474X9035A2
A2A7CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A7DS1	1990-0404	8	4	LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A2A7DS2	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A2A7DS3	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A2A7DS4	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A2A7J1	1251-5316	5	1	CONNECTOR 34-PIN POST SERIES	28480	1251-5316
A2A7L1	08672-80001	3	1	TOROID-FILTER, 600UH	28480	08672-80001
A2A7Q1	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A7Q2	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A7Q3	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A7Q4	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A7Q5	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A7Q6	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A7Q7	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A7R1	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R2	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R3	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R4	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R5	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A7R6	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R7	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R8	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R9	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R10	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R11	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R12	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R13	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R14	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R15	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R16	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R17	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R18	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R19	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R20	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R21	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R22	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R23	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R24	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R25	0757-0465	6	7	RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A7R26	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A7R27	0698-3450	9	1	RESISTOR 42.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4222-F
A2A7R28	0698-3161	9	1	RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A2A7R29	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R30	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A7R31	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A7R32	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A7R33	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A7R34	0698-3442	9	5	RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A2A7R35	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A2A7R36	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A2A7R37	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A2A7R38	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A7R39	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R40	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A7R41	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R42	0698-3154	0	1	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A2A7R43	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A7R44	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A7R45	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A7R46	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A7R47	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A7R48	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7U1	1826-0502	0	5	IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A2A7U2	1826-0502	0		IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A2A7U3	1820-1962	6	5	IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A2A7U4	1820-2083	4	1	IC CNTR CMOS UP/DOWN POS-EDGE-TRIG	07263	4029BPC
A2A7U5	1820-1962	6		IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A2A7U6	1820-1746	4	12	IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A7U7	1820-1961	5	3	IC GATE CMOS NAND TPL 3-INP	04713	MC14023BCP
A2A7U8	1820-1747	5	12	IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A7U9	1826-0502	0		IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A2A7U10	1826-0502	0		IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A2A7U11	1826-0502	0		IC SWITCH ANLG QUAD 14-DIP-P PKG	04713	MC14066BCP
A2A7U12	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A7U13	1820-1745	3	7	IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A7U14	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A7U15	1820-1569	9	2	IC MV CMOS MONOSTBL RETRIG/RESET DUAL	04713	MC14538BCL
A2A7U16	1820-1569	9		IC MV CMOS MONOSTBL RETRIG/RESET DUAL	04713	MC14538BCL
A2A7U17	1820-1963	7	7	IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A7U18	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A7U19	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A7U20	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A7U21	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A7U22	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A7U23	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A7U24	1820-1976	2	7	IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A7U25	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A7U26	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
				A2A7 MISCELLANEOUS		
	4040-0748	3	5	EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0750	7	1	EXTR-PC BD RED POLYC .062-BD-THKNS	28480	4040-0750
	3050-0079	3		WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2		TACK-RUBBER	28480	10534-4001

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A8†	08672-60140	9	1	ASSEMBLY, OUTPUT REGISTER	28480	08672-60140
A2A8C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A8C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A8C3	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A8C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A8C5	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A8C6	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A8C7*†	0160-4103	2	1	CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J
A2A8DS1	2140-0016	8	1	LAMP-INCAND 683 5VDC 60MA T-1-BULB	00115	683
A2A8L1	9100-4078	3		INDUCTOR-TOROID	28480	9100-4078
A2A8Q1	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A8Q2	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A8Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A8Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A8R1	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A8R2	0683-1055	5	1	RESISTOR 1M 5% .25W FC TC=-800/+960	01121	CB1055
A2A8R3	0757-0461	2	2	RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6812-F
A2A8R4	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R5	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R6	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R7	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R8	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R9	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6812-F
A2A8R10	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R11	0757-0439	4	1	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A2A8R12	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A8R13	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R14	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R15	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R16	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A8R17	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R18	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R19	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R20	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R21	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A8R22	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A8R23	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A8R24	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A8R25	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A2A8R26	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A2A8TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A8TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A8TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A8U1	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U2	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U3	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U4	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A8U5	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U6	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U7	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U8	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U9	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U10	1820-1955	7	5	IC ADDR CMOS FULL ADDER 4-BIT	3L585	CD4008BE
A2A8U11	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U12†	1820-1283	4	4	IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS95BN
A2A8U13†	1820-1283	4		IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS95BN
A2A8U14†	1820-1283	4		IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS95BN
A2A8U15	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U16	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U17	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	3L585	CD4008BE
A2A8U18	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	3L585	CD4008BE
A2A8U19	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A8U20	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	3L585	CD4008BE
A2A8U21	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A8U22†	1820-1283	4		IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS95BN
A2A8U23†	1820-1444	9	2	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS298N
A2A8U24	08672-80014	8	1	PROM DIVIDER 2	28480	08672-80014
A2A8U25	08672-80015	9	1	PROM DIVIDER 1	28480	08672-80015
A2A8U26	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A8U28	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A8U29	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	3L585	CD4008BE

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A8XU23†	1200-0507	9	1	SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
				A2A8 MISCELLANEOUS		
	1480-0073	6	6	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0753	0	1	EXTR-PC BD GRN POLYC .062-BD-THKNS	28480	4040-0753
	3050-0079	3		WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2		TACK-RUBBER	28480	10534-4001
A2A9	08672-60017	9	1	ASSEMBLY, HP-IB ADDRESS	28480	08672-60017
A2A9C1	0180-0291	3	1	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A2A9C2	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A2A9C3	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A2A9C4	0160-0574	3	3	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A2A9C5	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A9C6	0160-0571	0	5	CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A2A9C7	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A2A9C8	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A2A9C9	0160-0174	9	1	CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A2A9CR1	1901-0518	8	10	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A9CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A9CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A9CR4	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A9CR5	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A9J1	1251-3283	1	1	CONNECTOR 24-PIN F MICRORIBBON	28480	1251-3283
A2A9L1	9100-4078	3		INDUCTOR-TOROID	28480	9100-4078
A2A9Q1	1854-0039	7	1	TRANSISTOR NPN 2N3053S SI TO-39 PD=1W	3L585	2N3053S
A2A9R1	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R2	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R3	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R4	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R5	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R6	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-TO-316R-F
A2A9R7	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-TO-316R-F
A2A9R8	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-TO-316R-F
A2A9R9	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R10	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A2A9R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A2A9R12	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A2A9R13	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R14	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A2A9R15	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-TO-316R-F
A2A9R16	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R17	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R18	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R19	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1003-F
A2A9R20	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R21	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A2A9R22	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R23	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1003-F
A2A9R24	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1003-F
A2A9R25	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R26	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R27	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R28	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R29	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R30	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9R31	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A2A9S1	3100-3371	1	1	SWITCH-RTRY DP4T-NS .55-DIA IDX-ANG=36	28480	3100-3371
A2A9S2	3100-3372	2	1	SWITCH-RTRY SP8T-NS .55-DIA IDX-ANG=36	28480	3100-3372
A2A9S3	3100-3369	7	1	SWITCH-RTRY SP8T-NS .55-DIA IDX-ANG=36	28480	3100-3369
A2A9S4	3100-3370	0	1	SWITCH-RTRY SP3T-NS .55-DIA IDX-ANG=36	28480	3100-3370
A2A9U1	1820-1749	7	1	IC DRVR DSPL DRVR	28480	1820-1749
A2A9U2	1820-1962	6		IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A2A9U3	1820-1962	6		IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A2A9U4	1820-1962	6		IC DCDR CMOS BCD-TO-DEC	3L585	CD4028BE
A2A9U5	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A9U6	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A9U7	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A9U8	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A9U9	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A9U10	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A9U11	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A9U12	1820-1522	4	2	IC UART TTL QUAD	04713	MC3440P
A2A9U13	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A9U14	1820-1522	4		IC UART TTL QUAD	04713	MC3440P
A2A9U15	1820-1961	5		IC GATE CMOS NAND TPL 3-INP	04713	MC14023BCP
A2A9U16	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A9U17	1820-1964	8	2	IC FF CMOS J-K POS-EDGE-TRIG DUAL	3L585	CD4027BE
A2A9U18	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A9U19	1820-1964	8		IC FF CMOS J-K POS-EDGE-TRIG DUAL	3L585	CD4027BE
A2A9U20	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A9U21	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A9U22	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A9U23	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A9U24	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A9U25	1820-2079	8		IC GATE CMOS NOR DUAL 4-INP	04713	MC14002BCP
A2A9U26	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A9U27	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A9U28	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A9U29	1820-1558	6	2	IC UART TTL QUAD	04713	MC3441AP
A2A9U30	1820-1558	6		IC UART TTL QUAD	04713	MC3441AP
				A2A9 MISCELLANEOUS		
	0380-0643	3	2	STANDOFF-HEX .255-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
	1200-0173	5	1	INSULATOR-XSTR DAP-GL	28480	1200-0173
	1530-1098	4	2	CLEVIS 0.070-IN W SLT; 0.454-IN PIN CTR	00000	ORDER BY DESCRIPTION
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0755	2	2	EXTR-PC BD VIO POLYC .062-BD-THKNS	28480	4040-0755
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	3050-0079	3		WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2		TACK-RUBBER	28480	10534-4001
A2A10†	08672-60149	8	1	ASSEMBLY, REGISTER I	28480	08672-60149
A2A10C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A10C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A10C3	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A10C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A10C5	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A10C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A10CR1	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A10CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A10L1	9100-4078	3		INDUCTOR-TOROID	28480	9100-4078
A2A10Q1	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A10R1	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A10R2	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R3	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R4	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R5	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R6	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R7	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A2A10R8	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A10R9	0757-0290	5	1	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A2A10R10	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A10R11	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R12	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R13†				NOT ASSIGNED		
A2A10R14	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R15	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R16	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R17	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R18	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R19	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R20	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A10R21†	0757-0280	3	26	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A10U1	1820-0701	9	1	IC LCH TTL L D-TYPE 4-BIT	07263	93L14PC
A2A10U2	1820-1965	9	1	IC GATE CMOS NOR TPL 3-INP	04713	MC14025BCP
A2A10U3	08672-80012	6	1	PROM BAND-DECODER 2	28480	08672-80012
A2A10U4	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A10U5	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A10U6	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A10U7	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U8	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U9	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U10	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A10U11	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A10U12	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A10U13	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A10U14	08672-80013	7	1	PROM BAND-DECODER 1	28480	08672-80013
A2A10U15	1820-0910	2	4	IC ADDR TTL LS BIN FULL ADDR 4-BIT	01295	SN74LS83AN
A2A10U16	1820-0961	3	1	IC SHF-RGTR CMOS D-TYPE PRL-IN	3L585	CD4021AF
A2A10U17	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A10U18	1820-1976	2		IC BFR CMOS NON-INV HEX	3L585	CD4050BE
A2A10U19	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U20	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U21	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U22	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U23	1820-2080	1		IC SHF-RGTR CMOS SYNCHRO PRL-IN PRL-OUT	04713	MC14035BCP
A2A10U24†	1820-0946	4	1	IC GATE CMOS NOR QUAD 2-INP	3L585	CD4001UBE
A2A10U25†	1820-1444	9		IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS298N
A2A10U26†	1820-1144	6	4	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A2A10U27†	1820-1112	8	5	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
				A2A10 MISCELLANEOUS		
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	4040-0755	2		EXTR-PC BD VIO POLYC .062-BD-THKNS	28480	4040-0755
	3050-0079	3		WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2		TACK-RUBBER	28480	10534-4001
A2A11	08672-60012	4	1	ASSEMBLY, TIMING CONTROL	28480	08672-60012
A2A11C1	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A11C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11C4	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A11C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11C6	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A2A11C7	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A2A11C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11C9	0160-0127	2	1	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A2A11C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A11C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A11C12	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A2A11C13	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A2A11C14	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A11C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A11C16	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A11C17	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A2A11C18†	0160-0570	9	1	CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A2A11C19†	0140-0196	3	1	CAPACITOR-FXD 150PF +-5% 300VDC MICA	72136	DM15F151J0300WV1CR
A2A11C20	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A11CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR4	1901-0376	6	2	DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A11CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR7	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A11CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR9	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A11CR10	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR11	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR12	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A11CR13	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR14	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A11CR15	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR16				NOT ASSIGNED		
A2A11CR17	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR18	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A11CR19				NOT ASSIGNED		
A2A11CR20†				NOT ASSIGNED		
A2A11CR21†				NOT ASSIGNED		
A2A11L1	9100-4078	3		INDUCTOR-TOROID	28480	9100-4078
A2A11Q1	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A11Q2	1853-0015	7	1	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
A2A11Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A11Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A11Q5	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A11Q6	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A11Q7	1854-0019	3		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A2A11R1	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A2A11R2	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A11R3	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A11R5	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R6	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R7	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R8	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R10	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R11	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A11R12	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A2A11R13	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R14	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R15	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R16	0757-0463	4	2	RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8252-F
A2A11R17	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A11R18	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R19	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R20	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R21	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R22	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A11R23	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R24	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R25	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R26	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A11R27	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A2A11R28	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R29	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A2A11R30	0698-3132	4	1	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A2A11R31	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A11R32	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R33	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R34	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R35	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R36	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A2A11R37	0757-0463	4		RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8252-F
A2A11R38	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A11R39	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A11R40	0698-3452	1		RESISTOR 147K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1473-F
A2A11R41	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R42	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A11R43	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R44	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A11R45†	0757-0442	9	16	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R46†	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A11R47†				NOT ASSIGNED		
A2A11S1	3101-1277	4	1	SWITCH-TGL SUBMIN SPDT .5A 120VAC PC	28480	3101-1277
A2A11U1	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A11U2	1820-2015	2	1	IC GATE CMOS EXCL-OR QUAD	04713	MC14070BCP
A2A11U3	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A11U4	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A11U5	1820-1144	6		IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A2A11U6	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A11U7	1820-1144	6		IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A2A11U8†	1820-1144	6		IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A2A11U9	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A11U10	1820-1745	3		IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A2A11U11	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A11U12	1820-1746	4		IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A11U13	1820-1204	9	1	IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A2A11U14	1820-1194	6	1	IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A2A11U15	1820-1211	8	1	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
A2A11U16	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A11U17	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A11U18	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A11U19	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A11U20	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A11U21	1820-0778	0	1	IC CNTR TTL L BIN SYNCHRO POS-EDGE-TRIG	07263	93L16PC
A2A11U22	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A11U23	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A11U24†	08672-80019	3	1	PROM-OFFSET	28480	08672-80019
A2A11U25	1820-1747	5		IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A11U26	1820-1960	4	1	IC GATE CMOS NAND DUAL 4-INP	04713	MC14012BCP
A2A11U27	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A11U28	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A2A11U29	1820-1961	5		IC GATE CMOS NAND TPL 3-INP	04713	MC14023BCP
A2A11U30	1820-0910	2		IC ADDR TTL LS BIN FULL ADDR 4-BIT	01295	SN74LS83AN
A2A11U31	1820-0910	2		IC ADDR TTL LS BIN FULL ADDR 4-BIT	01295	SN74LS83AN
A2A11U32	1820-0661	0	1	IC GATE TTL OR QUAD 2-INP	01295	SN7432N
A2A11U33	1820-0910	2		IC ADDR TTL LS BIN FULL ADDR 4-BIT	01295	SN74LS83AN
A2A11U34†	1820-1423	4	2	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
				A2A11 MISCELLANEOUS		
	0340-0060	4	1	TERMINAL-STUD SPCL-FDTHRU PRESS-MTG	98291	011-6809 000 209
	0360-1730	9	12	CONNECTOR-SGL CONT PIN .059-IN-BSC-SZ	28480	0360-1730
	4040-0747	2	1	EXTR-PC BD GRA POLYC .062-BD-THKNS	28480	4040-0747
	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	3050-0079	3		WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	28480	3050-0079
	10534-4001	2		TACK-RUBBER	28480	10534-4001
A2A12†	08672-60177	2	1	BOARD ASSEMBLY, MOTHER	28480	08672-60177
A2A12C1	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C2	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C3	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C4	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C5	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C6	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C7	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C8	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C9	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C10	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C11	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C12	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C13	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C14	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C15	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C16	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A12C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A12C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A12CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A12CR2†	1901-0535	9	5	DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A12CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A12J1	1251-3024	8		CONNECTOR 26-PIN M RECTANGULAR	28480	1251-3024
A2A12J2	1250-1255	1	1	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A2A12R1	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A12R2	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A2A12VR1	1902-0049	2	1	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A2A12W1	8120-2117	8	1	CABLE ASSY-COAX 11.94-IN-LG BLK	28480	8120-2117
A2A12XA2A3	1251-2026	8	3	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A12XA2A4	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A12XA2A5	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A12XA2A7A	1251-2035	9	12	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A7B	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A7C	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A8A	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A8B	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A8C	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A9C	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A10B	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A10C	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A11A	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A11B	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A2A12XA2A11C	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
				A2A12 MISCELLANEOUS		
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
				A2 CHASSIS PARTS		
A2BT1	08672-60092	0	1	BATTERY PACK	28480	08672-60092
	08672-00011	7	1	CLAMP, BATTERY	28480	08672-00011
A2DS1	1990-0651	7	4	DISPLAY-AN-DOT MAT	28480	5082-7340
A2DS2	1990-0651	7		DISPLAY-AN-DOT MAT	28480	5082-7340
A2DS3	1990-0651	7		DISPLAY-AN-DOT MAT	28480	5082-7340
A2DS4	1990-0651	7		DISPLAY-AN-DOT MAT	28480	5082-7340
A2DS5†	1990-0686	8	4	DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2DS6†	1990-0686	8		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G
A2DS7†	1990-0686	8		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G
A2DS8†	1990-0686	8		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7300,CAT E-G
A2MP1	08672-40005	3	6	PUSHBUTTON	28480	08672-40005
A2MP2	0370-2389	7	1	KNOB-BASE 1-1/2 JGK .25-IN-ID	28480	0370-2389
A2MP3	5040-6927	3	6	DIVIDER STRIP	28480	5040-6927
A2MP4	08672-20033	5	1	WINDOW-CONTROLLER (8672A ONLY)	28480	08672-20033
A2MP5	1460-0553	5		STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
A2MP6	1460-0553	5		STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
A2MP7	08672-00064	0	1	SHIELD RFI	28480	08672-00064
A2MP8†	7100-1266	3	1	CAN & COVER	28480	7100-1266
A2MP9†	08672-20142	7	1	HOUSING, AMPLIFIER	28480	08672-20142
A2MP10†	08672-20120	1	12	WASHER, STEP	28480	08672-20120
A2MP11†	08672-20146	1	1	MOUNTING BLOCK	28480	08672-20146
A2MP12†	08672-20147	2	1	STANDOFF COVER	28480	08672-20147
A2S1	3101-0613	0	1	SWITCH-TGL SUBMIN SPDT 5A 120VAC PC	28480	3101-0613
A2W1	08672-60026	0	1	CABLE,RIBBON,26-CONDUCTOR(A2A1 TO A2A12)	28480	08672-60026
	1251-3880	4	2	CONNECTOR 26-PIN F POST TYPE	28480	1251-3880
A2W2	08672-60030	6	1	CABLE ASSEMBLY, VCO OUTPUT,RED	28480	08672-60030
	1250-0872	6	2	CONNECTOR-RF SMB FEM UNMTD 50-OHM	28480	1250-0872
A2W3	08672-60058	8	1	CABLE ASSEMBLY, 34-CONDUCTOR (A2A6 TO A2A7)	28480	08672-60058
	1251-3019	1	2	CONNECTOR 34-PIN F POST TYPE	28480	1251-3019
A2XBT1	08672-60029	3	1	BATTERY HOLDER ASSEMBLY INCLUDES:	28480	08672-60029
	0362-0227	1	2	CONNECTOR-SGL CONT SKT 1.14-MM-BSC-SZ	28480	0362-0227
	0363-0067	9	2	CONTACT, BATTERY	28480	0363-0067
	0624-0303	0	4	SCREW-TPG 2-28 .312-IN-LG PAN-HD-PHL STL	28480	0624-0303
	08672-00009	3	1	SUPPORT, BATTERY PAK	28480	08672-00009
	08672-20030	2	1	HOLDER, BATTERY	28480	08672-20030
	0400-0082	8	1	GROMMET, CHANNEL	28480	0400-0082
				A2 MISCELLANEOUS		
	0515-0095	6	1	SCREW-THUMB M3.5 X 0.6 6.35MM-LG	00000	ORDER BY DESCRIPTION
	08672-00001	5	1	PANEL, SUB-FRONT	28480	08672-00001
	08672-00002	6	1	PANEL, RIGHT-FRONT	28480	08672-00002
	08672-20032	4	1	HEAT SINK, L.E.D.	28480	08672-20032
	08672-20035	7	1	LIGHT PIPE, LONG	28480	08672-20035
	08672-20036	8	3	LIGHT PIPE, MEDIUM	28480	08672-20036
	08672-40001	9	2	HOUSING, LAMP	28480	08672-40001
	08672-40002	0	6	BAR, LIGHT	28480	08672-40002
	08672-00003	7	1	GUSSET, CENTER	28480	08672-00003
	08672-00004	8	1	GUSSET, RIGHT	28480	08672-00004
	08672-00005	9	1	GUSSET, ADAPTER BOARD	28480	08672-00005
	08672-00006	0	1	BAR, TIE RIGHT	28480	08672-00006
	08672-20037	9	2	SUPPORT, FRONT PANEL	28480	08672-20037
	08672-00012	8	2	COVER, DIGITAL BOARDS	28480	08672-00012
	08672-00015	1	1	SUPPORT, BOTTOM	28480	08672-00015
	08672-00018	4	1	PLATE, REAR GUIDE	28480	08672-00018
	08672-00020	8	1	PANEL, REAR, HP-IB	28480	08672-00020

See introduction to this section for ordering information
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Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3				A3 RF SOURCE ASSEMBLY		
A3A1				M/N REFERENCE ASSEMBLY		
A3A1A1	86701-60021	5	1	REFERENCE PHASE DETECTOR ASSEMBLY	28480	86701-60021
A3A1A1C1	0180-0197	8	19	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C3	0180-1746	5	8	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A1A1C4†	0160-3879	7	31	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A1C5	0140-0190	7	2	CAPACITOR-FXD 39PF +-5% 300VDC MICA	72136	DM15E390J0300WV1CR
A3A1A1C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A1C7	0160-2055	9	52	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C8	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A1C10	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C11	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C12	0160-2199	2	7	CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A1A1C13	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C14	0160-2204	0	6	CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A1C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A1C16	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C17	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C18	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C19	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C20	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C21	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C22	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C23	0180-0553	0	1	CAPACITOR-FXD 22UF+-20% 25VDC TA	28480	0180-0553
A3A1A1C24	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C25	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C26	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A1C27	0140-0193	0	6	CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A1A1C28	0180-0491	5	4	CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A3A1A1C29	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C30	0140-0193	0		CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A1A1C31	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A1A1C32	0170-0066	9	1	CAPACITOR-FXD .027UF +-10% 200VDC POLYE	28480	0170-0066
A3A1A1C33	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C34	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C35	0140-0193	0		CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A1A1C36	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C37	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C38	0140-0193	0		CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A1A1C39	0160-3454	4	25	CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A1C40	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A1A1C41	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C42	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C43	0160-2206	2	1	CAPACITOR-FXD 160PF +-5% 300VDC MICA	28480	0160-2206
A3A1A1C44	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C45	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C46	0140-0210	2	3	CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A1A1C47	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C48	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A1A1C49	0160-2201	7	1	CAPACITOR-FXD 51PF +-5% 300VDC MICA	28480	0160-2201
A3A1A1C50	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C51	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A1A1C52	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C53	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A1C54	0180-0183	2	1	CAPACITOR-FXD 10UF+75-10% 50VDC AL	56289	30D106G050CB2
A3A1A1C55	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A1A1C56	0180-0229	7	3	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A3A1A1C57	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A1C58	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A1C59	0160-3878	6	35	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A1C60	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A1C61	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A1C62	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A1CR1	1901-0518	8	6	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A1CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A1CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A1CR4	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A1CR5	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A1CR6	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A1J1	1250-0544	9	8	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A1J2	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A1J3	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A1J4	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A1J5	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A1L1	9140-0238	3	2	INDUCTOR RF-CH-MLD 82UH 5% .166DX.385LG	28480	9140-0238
A3A1A1L2	9140-0238	3		INDUCTOR RF-CH-MLD 82UH 5% .166DX.385LG	28480	9140-0238
A3A1A1L3	9140-0143	9	3	INDUCTOR RF-CH-MLD 3.3UH 10% .105DX.26LG	28480	9140-0143
A3A1A1L4	9140-0143	9		INDUCTOR RF-CH-MLD 3.3UH 10% .105DX.26LG	28480	9140-0143
A3A1A1L5	9100-2261	2	1	INDUCTOR RF-CH-MLD 2.7UH 10% .105DX.26LG	28480	9100-2261
A3A1A1L6	9140-0114	4	1	INDUCTOR RF-CH-MLD 10UH 10% .166DX.385LG	28480	9140-0114
A3A1A1L7	9100-2255	4	4	INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A3A1A1L8	9100-0368	6	4	INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A3A1A1L9	9100-2257	6	3	INDUCTOR RF-CH-MLD 820NH 10% .105DX.26LG	28480	9100-2257
A3A1A1L10	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A3A1A1L11	9100-2257	6		INDUCTOR RF-CH-MLD 820NH 10% .105DX.26LG	28480	9100-2257
A3A1A1L12	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A3A1A1L13	9100-2257	6		INDUCTOR RF-CH-MLD 820NH 10% .105DX.26LG	28480	9100-2257
A3A1A1L14	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A3A1A1L15	9100-2256	5	1	INDUCTOR RF-CH-MLD 560NH 10% .105DX.26LG	28480	9100-2256
A3A1A1Q1	1854-0019	3	3	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A3A1A1Q2	1854-0019	3		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A3A1A1Q3	1854-0019	3		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A3A1A1Q4	1855-0049	1	1	TRANSISTOR-JFET DUAL N-CHAN D-MODE SI	28480	1855-0049
A3A1A1Q5	1853-0451	5	15	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A1Q6	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A1Q7	1853-0034	0	1	TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A3A1A1R1	0757-0399	5	3	RESISTOR 82.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-82R5-F
A3A1A1R2	0757-0417	8	1	RESISTOR 562 1% .125W F TC=0+-100	24546	C4-1/8-T0-562R-F
A3A1A1R3	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A1R4	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A1R5	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A3A1A1R6	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A1R7	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A1A1R8	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A1R9	0757-0399	5		RESISTOR 82.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-82R5-F
A3A1A1R10	0698-7222	1	2	RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A3A1A1R11	0698-7219	6	7	RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A1A1R12	0757-0442	9	20	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A1R13	0698-3453	2	3	RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A3A1A1R14	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A1R15	0698-3453	2		RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A3A1A1R16	0757-0441	8	6	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A1A1R17	0698-3438	3	3	RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A3A1A1R18	0757-0346	2	31	RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R19	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R20	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A1A1R21	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A3A1A1R22	0698-3136	8	1	RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A3A1A1R23	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R24	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A1R25	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R26	0757-0280	3	23	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A1R27	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A1R28	0698-3450	9	3	RESISTOR 42.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4222-F
A3A1A1R29	0698-3449	6	2	RESISTOR 28.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2872-F
A3A1A1R30	0757-0444	1	2	RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A3A1A1R31	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A1R32	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R33	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A1R34	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A1R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A1R36	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A3A1A1R37	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A3A1A1R38	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A1A1R39	0757-0440	7	5	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A3A1A1R40	0757-0394	0	16	RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A1R41	0698-3446	3	2	RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A3A1A1R42	0698-0085	0	7	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A1A1R43	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A1R44	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A1R45	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A1R46	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A1R47	0698-3453	2		RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A3A1A1R48	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A1R49	0698-7285	6	1	RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1103-F
A3A1A1R50	0698-3157	3	6	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A1A1R51†	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A1A1R52	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A1R53	0698-3440	7	8	RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A1A1R54	0698-7234	5	1	RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A3A1A1R55	0698-7257	2	1	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A3A1A1R56	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A1R57	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A3A1A1R58	0698-7246	9	1	RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A3A1A1R59	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A1A1R60	0757-0276	7	3	RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A3A1A1R61	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A1R62	0757-1094	9	3	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A3A1A1R63	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A1A1R64	0698-3132	4	4	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A3A1A1R65	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A1A1R66	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A1A1R67	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A1R68	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A1R69	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A1R70	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A1R71	0757-0274	5	1	RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A3A1A1R72	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A3A1A1R73	0757-0317	7	3	RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A3A1A1R74	0757-0289	2	1	RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A3A1A1R75†	0698-7236	7	4	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A3A1A1T1	86701-60082	8	2	TRANSFORMER, RF GRN	28480	86701-60082
A3A1A1T2	86701-60082	8		TRANSFORMER, RF, GRN	28480	86701-60082
A3A1A1TP1	1251-0600	0	49	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A1U1	1821-0001	4	1	TRANSISTOR ARRAY 14-PIN PLSTC DIP	3L585	CA3046
A3A1A1U2	1820-0328	6	1	IC GATE TTL NOR QUAD 2-INP	01295	SN7402N
A3A1A1U3	1820-1383	5	1	IC CNTR ECL BCD POS-EDGE-TRIG	04713	MC10138L
A3A1A1U4	1820-0802	1	6	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A1U5	1820-0223	0	6	IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A1A1U6	1820-0429	8	1	IC V RGLTR TO-39	18324	LM309H
A3A1A1VR1	1902-3082	9	3	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A3A1A1VR2†	1902-3256	9	1	DIODE-ZNR 23.7V 5% DO-35 PD=.4W	28480	1902-3256
A3A1A1W1	86701-60059	9	1	CABLE ASSEMBLY, GRAY/ORANGE/WHITE	28480	86701-60059
				A3A1A1 MISCELLANEOUS		
	1205-0250	9	1	THERMAL LINK SGL TO-5/TO-39-CS	28480	1205-0250
	2190-0124	4	6	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2200-0101	0	7	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9	3	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	6040-0239	9		LUBRICANT-GREASE SIL	05020	126
	86701-20040	4	1	COVER, P.C. (PHASE LOCK)	28480	86701-20040
	86701-40001	9	8	EXTRACTOR, P.C.	28480	86701-40001
A3A1A2	86701-60020	4	1	100 MHZ VCXO ASSEMBLY	28480	86701-60020
A3A1A2C1	0121-0495	5	3	CAPACITOR-V TRMR-AIR 1.9-15.7PF 175V	74970	187-0309-125
A3A1A2C2	0121-0495	5		CAPACITOR-V TRMR-AIR 1.9-15.7PF 175V	74970	187-0309-125
A3A1A2C3	0121-0495	5		CAPACITOR-V TRMR-AIR 1.9-15.7PF 175V	74970	187-0309-125
A3A1A2C4	0121-0453	5	1	CAPACITOR-V TRMR-AIR 1.3-5.4PF 175V	74970	187-0303-125
A3A1A2C5	0180-0049	9	1	CAPACITOR-FXD 20UF+75-10% 50VDC AL	56289	30D206G050CC2
A3A1A2C6	0160-3456	6	3	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A1A2C7	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C8*†	0160-2257	3	2	CAPACITOR-FXD 10PF +-5% 500VDC CER 0+-60	28480	0160-2257
A3A1A2C9	0160-4084	8	10	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A1A2C10	0140-0191	8	1	CAPACITOR-FXD 56PF +-5% 300VDC MICA	72136	DM15E560J0300WV1CR
A3A1A2C11	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A2C12	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C13	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C14	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C15	0160-2261	9	8	CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C16	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C17	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C18	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C19	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C20	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A2C21	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C22	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C23	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C24	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C25	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C26	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C27	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C28	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C29	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C30	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C31	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C32	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C33	0160-2261	9		CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A2C34	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C35	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
~~A3A1A2C36~~	~~0160-3878~~	~~6~~		~~CAPACITOR-FXD 1000PF +-20% 100VDC CER~~	28480	~~0160-3878~~
A3A1A2C37	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C38	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C39	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C40	0160-2238	0	1	CAPACITOR-FXD 1.5PF +-.25PF 500VDC CER	28480	0160-2238
A3A1A2C41	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C42	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C43	0180-0116	1	12	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A1A2C44	0160-2253	9	1	CAPACITOR-FXD 6.8PF +-.25PF 500VDC CER	28480	0160-2253
A3A1A2C45	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C46	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A2C47	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C48	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A1A2C49	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A1A2C50	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A1A2C51	0160-4299	7	11	CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A2C52	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C53	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C54	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C55	0160-3454	4		CAPACITOR-FXD 220PF +-10% 1KVDC CER	28480	0160-3454
A3A1A2C56	0160-2437	1	13	CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A2CR1	0122-0245	5	1	DIODE-VVC 1N5139 6.8PF 10%	01281	1N5139
A3A1A2CR2				NOT ASSIGNED		
A3A1A2CR3	1901-0539	3	3	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A3A1A2CR4	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A3A1A2J1	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A2J2	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A2J3	1250-0544	9		CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	28480	1250-0544
A3A1A2J4				PART OF A3A1A2W1		
A3A1A2L1				NOT ASSIGNED		
A3A1A2L2	9100-2249	6	3	INDUCTOR RF-CH-MLD 150NH 10% .105DX.26LG	28480	9100-2249
A3A1A2L3	9140-0158	6	2	INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A1A2L4*†	9100-2254	3	3	INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A3A1A2L5	9100-2538	6	1	INDUCTOR RF-CH-MLD 1UH 10% .161DX.385LG *FACTORY SELECTED PART	28480	9100-2538
A3A1A2L6	9100-2251	0	5	INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A1A2L7	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A1A2L8	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A1A2L9	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A1A2L10				PART OF CIRCUIT BOARD		
A3A1A2L11				PART OF CIRCUIT BOARD		
A3A1A2L12				PART OF CIRCUIT BOARD		
A3A1A2L13				NOT ASSIGNED		
A3A1A2L14	9100-2247	4	2	INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A1A2L15	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A1A2Q1	1854-0345	8	16	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q5	1854-0247	9	5	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A1A2Q6	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q8	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q9	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q10	1854-0404	0	17	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A1A2Q11	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2R1	0757-0279	0	5	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A3A1A2R2	0757-0419	0	3	RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A3A1A2R3	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A1A2R4	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R5	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A2R6	0698-7224	3	6	RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A3A1A2R7	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A2R8	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A2R10	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R11	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A2R12	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R13	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A2R14	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R15	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R16	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R17	0698-3150	6	18	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R18	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R19	0698-7198	0	2	RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-26R1-F
A3A1A2R20	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R21	0698-3429	2	6	RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A1A2R22	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R23	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R24	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R25	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R26	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R27	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A1A2R28	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R29	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-26R1-F
A3A1A2R30	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R31	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A1A2R32	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R33	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R34	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A1A2R35	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A1A2R36	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R37	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R38	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R39	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R40	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R41	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A2R42	0698-0084	9	7	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A1A2R43	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A1A2R44	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A1A2R45	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A1A2R46	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A3A1A2R47	0757-0439	4	3	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A3A1A2R48	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R49	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A3A1A2R50	0757-0439	4		RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A3A1A2R51	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A2R52	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A2R53	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A2R54	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A1A2R55	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A1A2R56	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R57	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R58	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R59	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A1A2R60	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A2R61	0698-3441	8	2	RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A3A1A2R62	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A2R63				NOT ASSIGNED		
A3A1A2R64				NOT ASSIGNED		
A3A1A2R65				NOT ASSIGNED		
A3A1A2R66				NOT ASSIGNED		
A3A1A2R67*	0757-0402	1	3	RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A3A1A2R68*	0757-0246	1	1	RESISTOR 536 1% .25W F TC=0+-25	19701	MF52C1/4-T9-536R-F
A3A1A2R69*	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A3A1A2T1	86701-60081	7	3	TRANSFORMER, RF, BLUE	28480	86701-60081
A3A1A2T2	86701-60081	7		TRANSFORMER, RF, BLUE	28480	86701-60081
A3A1A2T3	86701-60081	7		TRANSFORMER, RF, BLUE	28480	86701-60081
A3A1A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A2W1	86701-60031	7	1	CABLE ASSEMBLY, GRAY/RED/WHITE	28480	86701-60031
A3A1A2Y1†	0410-1086	5	1	CRYSTAL-QUARTZ 100.00 MHZ HC-35/U-HLDR	28480	0410-1086
				A3A1A2 MISCELLANEOUS		

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
	2190-0009	4	14	WASHER-LK INTL T NO. 8 .168-IN-ID	28480	2190-0009
	2580-0002	4	22	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
	2200-0101	0		SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	6040-0239	9		LUBRICANT-GREASE SIL	05820	120
	86701-60073	7	1	SHIELD ASSEMBLY	28480	86701-60073
	86701-20039	1	1	COVER, P.C. VCXO	28480	86701-20039
	86701-40001	9		EXTRACTOR, P.C.	28480	86701-40001
A3A1A3†	86701-60077	1	1	M/N PHASE DETECTOR ASSEMBLY	28480	86701-60077
A3A1A3C1	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C2	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C3	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C4	0180-1731	8	5	CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A3A1A3C5	0160-0157	8	2	CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A3A1A3C6	0160-0161	4	4	CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A3C7	0160-0157	8		CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A3A1A3C8	0160-3535	2	2	CAPACITOR-FXD 560PF +-5% 300VDC MICA	28480	0160-3535
A3A1A3C9	0160-3535	2		CAPACITOR-FXD 560PF +-5% 300VDC MICA	28480	0160-3535
A3A1A3C10	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A3C11	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C12	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C13	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C14	0160-2406	4	1	CAPACITOR-FXD .27UF +-10% 80VDC POLYE	28480	0160-2406
A3A1A3C15	0160-3877	5	2	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A1A3C16	0140-0196	3	1	CAPACITOR-FXD 150PF +-5% 300VDC MICA	72136	DM15F151J0300WV1CR
A3A1A3C17	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A3C18	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C19	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C20	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A3C21	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C22	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A3C24	0180-0291	3	1	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3A1A3C25	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A3C26	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A3L1	9100-1641	0	7	INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A1A3L2	9100-2259	8	2	INDUCTOR RF-CH-MLD 1.5UH 10% .105DX.26LG	28480	9100-2259
A3A1A3L3	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A1A3L4	9100-2562	6	2	INDUCTOR RF-CH-MLD 100UH 10%	28480	9100-2562
A3A1A3L5	9100-2562	6		INDUCTOR RF-CH-MLD 100UH 10%	28480	9100-2562
A3A1A3Q1	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A3Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A3R1	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A3R2	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A3R3				NOT ASSIGNED		
A3A1A3R4	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A3R5	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A1A3R6				NOT ASSIGNED		
A3A1A3R7	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A1A3R8	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A3R9	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A3A1A3R10	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A3A1A3R11	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A3R12	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A3R13	0698-3260	9	1	RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A3A1A3R14	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A3R15	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A1A3R16	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A1A3R17	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A3R18	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A3R19	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A3R20	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A1A3R21	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A3R22	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A3R23	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4222-F
A3A1A3R24	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4222-F
A3A1A3R25	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A1A3R26	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A3R27	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A3R28	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A1A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3U1	1820-1344	8	2	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A1A3U2	1820-1225	4	2	IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U3	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U4	1820-0820	3	2	IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U5	1810-0251	3	3	NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U6	1810-0204	6	7	NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U7	1826-0092	3	4	IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A3A1A3U8	1820-0821	4	2	IC CNTR ECL BIN UP/DOWN SYNCHRO	04713	MC10136L
A3A1A3U9	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U10	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U11	1820-0806	5	2	IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U12	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U13	1820-1225	4		IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U14	1810-0251	3		NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U15	1826-0059	2	1	IC OP AMP GP TO-99 PKG	01295	LM201AL
A3A1A3U16	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U17	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U18	1820-0820	3		IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U19	1820-0821	4		IC CNTR ECL BIN UP/DOWN SYNCHRO	04713	MC10136L
A3A1A3U20	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U21	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A1A3U22	1810-0251	3		NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U23	1820-0806	5		IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U24	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3VR1	1902-3082	9		DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A3A1A3W1	86701-60051	1	1	CABLE ASSEMBLY, WHITE/RED	28480	86701-60051
A3A1A3W2	86701-60060	2	1	CABLE ASSEMBLY, GRAY/WHITE	28480	86701-60060
				A3A1A3 MISCELLANEOUS		
	0520-0128	7	15	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0520-0129	8	3	SCREW-MACH 2-56 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0590-0533	5	13	THREADED INSERT-NUT 2-56 .06-IN-LG SST	28480	0590-0533
	1205-0285	0		HEAT SINK SGL DIP	28480	1205-0285
	2190-0014	1	5	WASHER-LK INTL T NO. 2 .089-IN-ID	28480	2190-0014
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2200-0101	0		SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0103	2	67	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	6040-0239	9		LUBRICANT-GREASE SIL	05820	120
	86701-00032	2	1	BRACKET, HEAT SINK	28480	86701-00032
	86701-00033	3	1	BRACKET, HS	28480	86701-00033
	86701-20038	0	1	COVER, P.C. M/N DETECTOR	28480	86701-20038
	86701-40001	9		EXTRACTOR, P.C.	28480	86701-40001
A3A1A4	86701-60065	7	1	M/N VCO ASSEMBLY	28480	86701-60065
A3A1A4	86701-60071	5	1	M/N VCO ASSEMBLY (RESTORED 08672-60065)	28480	86701-60071
				A3A1A4 MISCELLANEOUS		
	0380-0020	0	1	SPACER-RND .25-IN-LG .128-IN-ID	00000	ORDER BY DESCRIPTION
	0520-0128	7		SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0520-0133	4	2	SCREW-MACH 2-56 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0510-0003	6	1	THREADED INSERT-NUT 8-32 .094-IN-LG STL	28480	0510-0003
	2190-0045	8	4	WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0045
	3050-0672	2	1	WASHER-SHLDR NO. 4 .118-IN-ID .25-IN-OD	28480	3050-0672
	86701-20046	0	1	PROBE	28480	86701-20046
	86701-20047	1	1	SUPPORT, RESONATOR	28480	86701-20047
A3A1A4A1	86701-60029	3	1	VCO RESONATOR ASSEMBLY (NOT REPAIRABLE)	28480	86701-60029
A3A1A4A2	86701-60027	1	1	BOARD ASSEMBLY, M/N VCO	28480	86701-60027
A3A1A4A2C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A4A2C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C5	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A1A4A2C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C8	0160-3873	1	1	CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A3A1A4A2C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A4A2C11	0180-2161	0	1	CAPACITOR-FXD .75UF+-10% 50VDC TA	56289	150D754X9050A2
A3A1A4A2L1	9100-2891	4	6	INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A3A1A4A2L2	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A3A1A4A2L3	86701-20051	7	1	INDUCTOR	28480	86701-20051

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A4A2L4	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A1A4A2Q1	1854-0610	0	1	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A3A1A4A2Q2	1854-0686	0	1	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A3A1A4A2R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A1A4A2R2	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A1A4A2R3	0698-7193	5	1	RESISTOR 16.2 1% .05W F TC=0+-100	24546	C3-1/8-T0-16R2-F
A3A1A4A2R4†	0698-3154	0	12	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A1A4A2R5	0757-0428	1	6	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A1A4A2R6	0698-7262	9	1	RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1212-F
A3A1A4A2R7	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A1A4A2R8	0698-7254	9	1	RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5621-F
A3A1A4A2R9	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A1A4A2R10	0698-7265	2	1	RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A3A1A4A2R11	0698-7250	5	1	RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3831-F
A3A1A4A2R12	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A1A4A2R13	0757-0400	9	1	RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-90R9-F
A3A1A4A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A4A2W1	86701-60058	8	1	CABLE ASSEMBLY, VCO OUTPUT	28480	86701-60058
A3A1A4A2W2	86701-20050	6	1	CABLE, S/R JUMPER	28480	86701-20050
				A3A1A4A2 MISCELLANEOUS		
	0590-0526	6	14	THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
	86701-20052	8	2	SPACER, INSULATOR	28480	86701-20052
A3A1A5	86701-60018	0	1	M/N OUTPUT ASSEMBLY	28480	86701-60018
A3A1A5C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C3†	0160-2255	1	1	CAPACITOR-FXD 8.2PF +-.25PF 500VDC CER	28480	0160-2255
A3A1A5C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C6†				NOT ASSIGNED		
A3A1A5C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C8	0140-0192	9	2	CAPACITOR-FXD 68PF +-5% 300VDC MICA	72136	DM15E680J0300WV1CR
A3A1A5C9	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A1A5C10	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A5C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A5C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A5C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A5C14	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C15	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A5C16	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C18	0160-2257	3		CAPACITOR-FXD 10PF +-5% 500VDC CER 0+-60	28480	0160-2257
A3A1A5C19	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A1A5C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C22	0160-2266	4	1	CAPACITOR-FXD 24PF +-5% 500VDC CER 0+-30	28480	0160-2266
A3A1A5C23				NOT ASSIGNED		
A3A1A5C24	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A5C25	0160-0153	4	1	CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A3A1A5C26	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A5C27	0160-3534	1	1	CAPACITOR-FXD 510PF +-5% 100VDC MICA	28480	0160-3534
A3A1A5C28	0160-0298	8	1	CAPACITOR-FXD 1500PF +-10% 200VDC POLYE	28480	0160-0298
A3A1A5C29	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A5C30	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A1A5C31	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A5C32	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C33	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C34	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C35	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C36	0140-0192	9		CAPACITOR-FXD 68PF +-5% 300VDC MICA	72136	DM15E680J0300WV1CR
A3A1A5C37	0160-4351	2	1	CAPACITOR-FDTHRU 1000PF 20% 200V CER	28480	0160-4351
A3A1A5C38*†	0160-2306	3	1	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A3A1A5C39†				NOT ASSIGNED		
A3A1A5J1	1250-0657	5	3	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0657
A3A1A5J2	1250-0657	5		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0657
A3A1A5J3	1250-0657	5		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0657
A3A1A5J4	1250-1255	1	1	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A3A1A5L1	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A3A1A5L2†	9135-0081	3	1	INDUCTOR RF-CH-MLD 68NH 5% .102DX.26LG	28480	9135-0081
A3A1A5L3†				NOT ASSIGNED		
A3A1A5L4	9100-2248	5	2	INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A3A1A5L5	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A3A1A5L6	9100-1635	2	1	INDUCTOR RF-CH-MLD 91UH 5% .166DX.385LG	28480	9100-1635
A3A1A5L7	9100-1634	1	1	INDUCTOR RF-CH-MLD 75UH 5% .166DX.385LG	28480	9100-1634
A3A1A5L8	9100-1620	5	4	INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A3A1A5L9	9140-0210	1	1	INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A3A1A5L10	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5L11	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A3A1A5L12†				NOT ASSIGNED		
A3A1A5Q1	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q2	1853-0015	7	2	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
A3A1A5Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q5†	1854-0546	1	5	TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q6†	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q7†	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q8†	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q9†	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5R1	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A1A5R2	0698-7248	1	5	RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A1A5R3	0698-7243	6	5	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A1A5R4†	0698-7205	0	5	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A1A5R5	0698-7223	2	3	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A1A5R6	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A1A5R7	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A1A5R8	0698-7203	8	1	RESISTOR 42.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-42R2-F
A3A1A5R9	0698-7218	5	1	RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A1A5R10	0698-7188	8	5	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A1A5R11	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A1A5R12	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A1A5R13	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A1A5R14	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A1A5R15	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A3A1A5R16	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A1A5R17	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A1A5R18	0698-7208	3	1	RESISTOR 68.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-68R1-F
A3A1A5R19	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A1A5R20	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A1A5R21	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A1A5R22	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A1A5R23	0698-7229	8	3	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A1A5R24	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A1A5R25	0698-7247	0	1	RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A3A1A5R26	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A1A5R27	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A1A5R28	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A1A5R29	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A1A5R30	0698-7200	5	1	RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A3A1A5R31	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A1A5R32	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A1A5R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A3A1A5R34	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A3A1A5R35				NOT ASSIGNED		
A3A1A5R36*†	0698-7206	1	1	RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A3A1A5R37	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A1A5R38				NOT ASSIGNED		
A3A1A5R39	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A1A5R40*†	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A1A5R41*†	0698-7212	9	12	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A1A5R42†	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A1A5U1	0955-0063	0	1	MIXER, DOUBLE BALANCE	28480	0955-0063
A3A1A5U2	1820-2642	1	1	IC CNTR ECL BIN DUAL	28480	1820-2642
A3A1A5VR1	1902-3070	5	2	DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5VR2	1902-3070	5		DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5W1	86701-20055	1	1	JUMPER, COAX	28480	86701-20055
				A3A1A5 MISCELLANEOUS PARTS		
	0360-0452	0	1	TERMINAL-SLDR LUG PL-MTG FOR-#10-SCR	28480	0360-0452
	2190-0009	4		WASHER-LK INTL T NO. 8 .168-IN-ID	28480	2190-0009
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2200-0101	0		SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	5001-0176	0	1	GROUND STRAP	28480	5001-0176
	2200-0167	8	6	SCREW-MACH 4-40 .375-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
	2580-0002	4		NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
	86701-20056	2	1	COVER, BOTTOM	28480	86701-20056
	86701-00041	3	1	COVER, TOP	28480	86701-00041
	86701-40001	9		EXTRACTOR, P.C. BOARD	28480	86701-40001
	86701-20037	9	1	COVER, PC, M/N OUT	28480	86701-20037
	86701-20057	3	1	SHIELD, HOUSING	28480	86701-20057

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A6	86701-60022	6	1	M/N REFERENCE MOTHER ASSEMBLY	28480	86701-60022
A3A1A6C1	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C2	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C3	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C4	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C5	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C6	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C7	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C8	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C9	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C10	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C11	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6C12	0160-2437	1		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A3A1A6XA3A1A	5060-0112	8	2	CONNECTOR:15 CONTACTS	28480	5060-0112
A3A1A6XA3A1B	5060-0112	8		CONNECTOR:15 CONTACTS	28480	5060-0112
A3A1A6XA3A1	1251-4423	3	1	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-4423
A3A1A6XA3A1	1251-4174	1	2	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-4174
A3A1A6XA3A1	1251-2035	9	3	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A3A1A6XA3A1	1251-4174	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-4174
				A3A1A6 MISCELLANEOUS		
	0360-1514	7	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-1514
	2190-0009	4		WASHER-LK INTL T NO. 8 .169-IN-ID	28480	2190-0009
	2580-0002	4		NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
	86701-00031	1	2	INSULATOR	28480	86701-00031
	86701-00046	8	1	INSULATOR	28480	86701-00046
A3A2	86701-60012	4	1	RECTIFIER ASSEMBLY	28480	86701-60012
A3A2C1	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A2C2	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A2C3	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A2C4	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A2C5	0180-0230	0	1	CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
A3A2C6	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A2C7	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A2CR1	1901-0662	3	16	DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR2	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR3	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR4	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR5	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR6	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR7	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR8	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR9	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR10	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR11	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR12	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR13	1901-0496	1	2	DIODE-PWR RECT 100V 12A DO-4	04713	MR1121
A3A2CR14	1901-0496	1		DIODE-PWR RECT 100V 12A DO-4	04713	MR1121
A3A2CR15	1990-0404	8	6	LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A2CR16	1884-0018	5	6	THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A2CR17	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A2CR18	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A2F1	2110-0001	8	1	FUSE 1A 250V NTD 1.25X.25 UL	75915	312001
A3A2R1	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1961-F
A3A2R2	2100-3123	0	1	RESISTOR-TRMR 500 10% C SIDE-ADJ 17-TRN	02111	43P501
A3A2R3	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A2R4	0698-3444	1	8	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A2R5	0698-3447	4	5	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A2U1	1826-0126	4	1	IC 7818 V RGLTR TO-3	04713	MC7818CK
A3A2VR1	1902-3263	8	1	DIODE-ZNR 24.9V 2% DO-35 PD=.4W	28480	1902-3263
A3A2VR2	1902-3404	9	2	DIODE-ZNR 82.5V 5% DO-7 PD=.4W TC=+.082%	28480	1902-3404
A3A2XF1	2110-0269	0	12	FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
				A3A2 MISCELLANEOUS		
	0380-0617	1	2	SPACER-PRESS-IN .187 IN MAX OD; .459 IN	28480	0380-0617
	0590-0526	6		THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
	1200-0081	4	1	INSULATOR-FLG-BSHG NYLON	28480	1200-0081
	1251-2313	6	10	CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	28480	1251-2313
	2740-0003	5	4	NUT-HEX-W/LKWR 10-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
	6040-0239	9		LUBRICANT-GREASE SIL	05820	126
	5000-9043	6	6	PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2	6	EXTRACTOR, P.C. BOARD	28480	5040-6843
	86701-00018	4	1	HEAT SINK	28480	86701-00018
	86701-00025	3	1	INSULATOR	28480	86701-00025
A3A3†	86701-60080	6	1	POSITIVE REGULATOR ASSEMBLY	28480	86701-60080
A3A3C1	0180-2205	3	1	CAPACITOR-FXD .33UF+-10% 35VDC TA	56289	150D334X9035A2
A3A3C2	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A3C3	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A3C4	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A3C5	0180-0228	6	11	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A3C6	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A3C7	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A3C8	0160-3460	2	5	CAPACITOR-FXD .05UF +80-20% 100VDC CER	28480	0160-3460
A3A3C9	0160-3460	2		CAPACITOR-FXD .05UF +80-20% 100VDC CER	28480	0160-3460
A3A3C10	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A3C11	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A3C12	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A3C13	0160-0127	2	6	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A3C14	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A3C15†	0160-4298	6	2	CAPACITOR-FXD 4700PF +-20% 250VDC CER	56289	C067F251H472MS22-CDH
A3A3C16	0180-0491	5		CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A3A3CR1	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A3CR2	1884-0046	9	1	THYRISTOR-SCR VRRM=50	03508	C230F
A3A3CR3	1990-0487	7	1	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4504
A3A3CR4	1901-0033	2	21	DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR8	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR9	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A3CR10	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A3CR11	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3CR12	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A3F1†	2110-0036	9	1	FUSE 8A 125V NTD 1.25X.25 UL	75915	312008
A3A3F2	2110-0003	0	2	FUSE 3A 250V NTD 1.25X.25 UL	75915	312003
A3A3Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A3Q3	1853-0012	4	3	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A3A3Q4	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q5	1854-0441	5	2	TRANSISTOR NPN SI PD=5.8W FT=800KHZ	28480	1854-0441
A3A3Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q7	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q8	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q9	1854-0005	7	1	TRANSISTOR NPN 2N708 SI TO-18 PD=360MW	04713	2N708
A3A3Q10	1854-0039	7	1	TRANSISTOR NPN 2N3053S SI TO-39 PD=1W	3L565	2N3053S
A3A3R1	0757-0443	0	3	RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A3A3R2	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A3R3	0811-1659	8	1	RESISTOR .27 5% 2W PW TC=0+-800	75042	BWH2-27/100-J
A3A3R4	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A3A3R5	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A3A3R6	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A3R7	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R8	0698-3442	9	2	RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A3A3R9	0698-8465	6	1	RESISTOR 7.15K .5% .125W F TC=0+-50	28480	0698-8465
A3A3R10	0698-6835	0	9	RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A3R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A3R12	0757-0278	9	4	RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A3A3R13	0683-0275	9	5	RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB2705
A3A3R14	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A3R15	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A3R16	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A3A3R17	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F
A3A3R18	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A3R19	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A3R20	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A3R21	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A3A3R22	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A3R23	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A3A3R24	0698-3629	4	1	RESISTOR 270 5% 2W MO TC=0+-200	28480	0698-3629
A3A3R25	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A3R26	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A3R27	0811-1661	2	3	RESISTOR .39 5% 2W PW TC=0+-800	75042	BWH2-39/100-J
A3A3R28	0811-1661	2		RESISTOR .39 5% 2W PW TC=0+-800	75042	BWH2-39/100-J
A3A3R29	0811-1661	2		RESISTOR .39 5% 2W PW TC=0+-800	75042	BWH2-39/100-J
A3A3R30	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A3R31	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A3R32	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A3R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A3R34	0698-8466	7	1	RESISTOR 942 .5% .125W F TC=0+-50	28480	0698-8466
A3A3R35	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A3R36	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A3R37	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A3A3R38	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A3R39	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A3R40	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A3R41	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R42	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A3A3R43*	0698-3156	2	3	RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A3A3R44	0757-0459	8	1	RESISTOR 56.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5622-F
A3A3R45	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R46	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R47	0757-0290	5	4	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A3R48	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R49	0698-8464	5	2	RESISTOR 12.6K .5% .125W F TC=0+-50	28480	0698-8464
A3A3R50	2100-3095	5	1	RESISTOR-TRMR 200 10% C SIDE-ADJ 17-TRN	02111	43P201
A3A3R51	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A3A3R52	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A3R53	0698-4405	6	1	RESISTOR 107 1% .125W F TC=0+-100	24546	C4-1/8-T0-107R-F
A3A3R54	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A3R55	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A3R56	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A3R57	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A3R58	0698-3634	1	1	RESISTOR 470 5% 2W MO TC=0+-200	28480	0698-3634
A3A3R59†	0698-3162	0	2	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F
A3A3R60†	0757-0416	7	19	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A3RT1	0837-0126	6	1	THERMISTOR DISC 1K-OHM TC=-4.4%/C-DEG	28480	0837-0126
A3A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3U1	1826-0161	7	1	IC OP AMP GP QUAD 14-DIP-P PKG	04713	MLM324P
A3A3U2	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A3U3	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A3VR1	1902-3171	7	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A3A3VR2	1902-0686	3	2	DIODE-ZNR 6.2V 2% DO-7 PD=.4W TC=+.002%	04713	1N825
A3A3VR3	1902-3252	5	1	DIODE-ZNR 22.6V 2% DO-35 PD=.4W	28480	1902-3252
A3A3VR4	1902-0049	2	2	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A3A3VR5	1902-0686	3		DIODE-ZNR 6.2V 2% DO-7 PD=.4W TC=+.002%	04713	1N825
A3A3VR6	1902-3082	9		DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A3A3XF1	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
A3A3XF2	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
				A3A3 MISCELLANEOUS		
	0520-0128	7		SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0014	1		WASHER-LK INTL T NO. 2 .089-IN-ID	28480	2190-0014
	2190-0027	6	1	WASHER-LK INTL T 1/4 IN .256-IN-ID	28480	2190-0027
	2950-0051	8	3	NUT-HEX-DBL-CHAM 1/4-28-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2		EXTRACTOR, P.C. BOARD	28480	5040-6843
	86701-20036	8	1	MOUNTING BLOCK, DIODE	28480	86701-20036
A3A4†	86701-60078	2	1	NEGATIVE REGULATOR ASSEMBLY	28480	86701-60078
A3A4C1	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A4C2	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A4C3	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A4C4	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A4C5	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A4C6	0160-2199	2		CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A4C7	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A4C8	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A3A4C9	0160-3460	2		CAPACITOR-FXD .05UF +80-20% 100VDC CER	28480	0160-3460
A3A4C10	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A4C11	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A4C12†	0160-0575	4	2	CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A4C13	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A4C14	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A4C15	0160-3460	2		CAPACITOR-FXD .05UF +80-20% 100VDC CER	28480	0160-3460

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A4C16†	0180-0100	3	1	CAPACITOR-FXD 4.7UF+-10% 35VDC TA	56289	150D475X903582
A3A4CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR8	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR9	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR10	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A4CR11	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A4CR12	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR13	1990-0404	8		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4480
A3A4CR14	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A4CR15	1901-0159	3	2	DIODE-PWR RECT 400V 750MA DO-41	28480	1901-0159
A3A4CR16-A3A4CR24				NOT ASSIGNED		
A3A4CR25	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A4CR26	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A4CR27	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A4F1	2110-0083	6	1	FUSE 2.5A 250V NTD 1.25X.25 UL	28480	2110-0083
A3A4F2	2110-0043	8	2	FUSE 1.5A 250V NTD 1.25X.25 UL	28480	2110-0043
A3A4F3	2110-0010	9	1	FUSE 5A 250V NTD 1.25X.25 UL	75915	312005
A3A4K1	0490-0916	6	1	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A3A4Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A4Q2	1854-0441	5		TRANSISTOR NPN SI PD=5.8W FT=800KHZ	28480	1854-0441
A3A4Q3	1853-0001	1	1	TRANSISTOR PNP SI TO-39 PD=600MW	28480	1853-0001
A3A4Q4	1853-0007	7	6	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A4Q5	1854-0271	9	1	TRANSISTOR NPN SI TO-39 PD=1W FT=150MHZ	28480	1854-0271
A3A4Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A4Q7	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A4R1†	0812-0020	7	2	RESISTOR .39 5% 3W PW TC=0+-90	91637	CW281-3-T2-39/100-J
A3A4R2	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A4R3	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A4R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R5	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A4R6	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A4R7	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161 D
A3A4R8	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB2705
A3A4R9	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A4R10	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A4R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R12	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A4R13	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A4R14	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A4R15	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A4R16	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A4R17	0811-1665	6	1	RESISTOR .82 5% 2W PW TC=0+-800	75042	BWH2-82/100-J
A3A4R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R19	0698-3449	6		RESISTOR 28.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2872-F
A3A4R20	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R21	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A4R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A4R23†	0812-0020	7		RESISTOR .39 5% 3W PW TC=0+-90	91637	CW281-3-T2-39/100-J
A3A4R24	0698-8464	5		RESISTOR 12.6K .5% .125W F TC=0+-50	28480	0698-8464
A3A4R25	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A4R26	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A4R27	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB2705
A3A4R28	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A4R29	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R3-F
A3A4R30	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A4R31	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A4R32	0812-0066	1	3	RESISTOR .33 5% 2W PW TC=0+-800	75042	BWH2-33/100-J
A3A4R33	0812-0066	1		RESISTOR .33 5% 2W PW TC=0+-800	75042	BWH2-33/100-J
A3A4R34	0812-0066	1		RESISTOR .33 5% 2W PW TC=0+-800	75042	BWH2-33/100-J
A3A4R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R36	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A4R37	0698-6835	0		RESISTOR 3.16K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-3161-D
A3A4R38	0698-7050	3	1	RESISTOR 4.48K .5% .125W F TC=0+-50	28480	0698-7050
A3A4R39	0698-6853	2	1	RESISTOR 7.68K .5% .125W F TC=0+-50	24546	NC55-1/8-T2-7681-D
A3A4R40	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB2705

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A4R41	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A4R42	0698-3160	8	1	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A3A4R43	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4R44	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4R45	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4R46	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A4R47	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A4R48†	0757-0401	0	26	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4U1	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A4U2	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A4U3	1820-0223	0		IC OP AMP GP TO-99 PKG	3L585	CA301AT
A3A4VR1	1902-0025	4	2	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A3A4VR2	1902-3171	7		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A3A4VR3	1902-3330	0	1	DIODE-ZNR 44.2V 2% DO-35 PD=.4W	28480	1902-3330
A3A4VR4	1902-0049	2		DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A3A4XF1	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
A3A4XF2	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
A3A4XF3	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
				A3A4 MISCELLANEOUS		
	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2		EXTRACTOR, P.C. BOARD	28480	5040-6843
A3A5	86701-60015	7	1	DAC ASSEMBLY(DIGITAL-TO-ANALOG CONVERTER	28480	86701-60015
A3A5C1	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C2	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A5C3	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C4	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A3A5C5	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C6	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A5C7	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A3A5C8	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C9	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A3A5C10	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C11	0180-2141	6	1	CAPACITOR-FXD 3.3UF+-10% 50VDC TA	56289	150D335X9050B2
A3A5C12	0160-0160	3	1	CAPACITOR-FXD 8200PF +-10% 200VDC POLYE	28480	0160-0160
A3A5L1	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A5L2	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A5L3	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A5Q1	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A5Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q3	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q4	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A5Q5	1854-0475	5	3	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A3A5Q6	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q7	1854-0474	4	1	TRANSISTOR NPN SI PD=310MW FT=100MHZ	04713	2N5551
A3A5Q8	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A5Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q11	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A5Q12	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5R1	0811-3404	5	1	RESISTOR 3.55K .1% .05W PWW TC=0+-5	28480	0811-3404
A3A5R2	0811-3358	8	1	RESISTOR 7.2K .1% .05W PWW TC=0+-5	28480	0811-3358
A3A5R3	2100-1654	8	2	RESISTOR-TRMR 100 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-101
A3A5R4	2100-1448	8	1	RESISTOR-TRMR 200 5% WW SIDE-ADJ 22-TRN	32997	3057Y-1-201
A3A5R5	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A5R6	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A5R7	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A3A5R8	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A5R9	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A5R10	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A5R11	0811-3357	7	2	RESISTOR 6.25K .1% .05W PWW TC=0+-5	28480	0811-3357
A3A5R12	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A5R13†	2100-1657	1	1	RESISTOR-TRMR 1K 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-102
A3A5R14	0811-3359	9	5	RESISTOR 12.5K .1% .05W PWW TC=0+-5	28480	0811-3359
A3A5R15	0811-3357	7		RESISTOR 6.25K .1% .05W PWW TC=0+-5	28480	0811-3357
A3A5R16†	0699-0271	8	1	RESISTOR 715 .1% .125W F TC=0+-25	28480	0699-0271
A3A5R17	0811-3359	9		RESISTOR 12.5K .1% .05W PWW TC=0+-5	28480	0811-3359
A3A5R18	2100-1654	8		RESISTOR-TRMR 100 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-101
A3A5R19	0811-3359	9		RESISTOR 12.5K .1% .05W PWW TC=0+-5	28480	0811-3359
A3A5R20	2100-1656	0	4	RESISTOR-TRMR 500 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-501

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A5R21	0811-3360	2	1	RESISTOR 25K .1% .05W PWW TC=0+-5	28480	0811-3360
A3A5R22	2100-1656	0		RESISTOR-TRMR 500 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-501
A3A5R23	0811-3361	3	1	RESISTOR 50K .1% .05W PWW TC=0+-5	28480	0811-3361
A3A5R24	2100-1658	2	1	RESISTOR-TRMR 2K 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-202
A3A5R25	0811-2919	5	1	RESISTOR 100K .1% .125W PWW TC=0+-5	54294	SP70-1/16-C-1003-B
A3A5R26	0811-2037	8	1	RESISTOR 2.4K 1% .25W PWW TC=0+-10	20940	143-D-2401-F
A3A5R27	0811-3235	0	1	RESISTOR 7.5K 1% .05W PWW TC=0+-10	20940	140-1/20-7501-F
A3A5R28	0698-6358	2	1	RESISTOR 100K .1% .125W F TC=0+-25	28480	0698-6358
A3A5R29	2100-1656	0		RESISTOR-TRMR 500 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-501
A3A5R30	0811-1185	5	1	RESISTOR 10K .01% .05W PWW TC=0+-10	20940	140-1/20-1002-T
A3A5R31	0811-3359	9		RESISTOR 12.5K .1% .05W PWW TC=0+-5	28480	0811-3359
A3A5R32	0811-3138	2	1	RESISTOR 25K .1% .125W PWW TC=0+-10	20940	114-1/16-2502-B
A3A5R33	0811-0647	2	1	RESISTOR 50K .1% .125W PWW TC=0+-10	28480	0811-0647
A3A5R34	0698-8319	9	1	RESISTOR 10K 1% .1W F TC=0+-10	19701	502371/8-T13-1002-F
A3A5R35	0811-3362	4	1	RESISTOR 825 .1% .05W PWW TC=0+-10	28480	0811-3362
A3A5R36	0698-3193	7	1	RESISTOR 10K .25% .125W F TC=0+-50	28480	0698-3193
A3A5R37	0811-3359	9		RESISTOR 12.5K .1% .05W PWW TC=0+-5	28480	0811-3359
A3A5R38	0698-3235	8	1	RESISTOR 25K .25% .125W F TC=0+-50	03888	PME55-1/8-T2-2502-C
A3A5R39	0698-3220	1	1	RESISTOR 50K .25% .125W F TC=0+-50	28480	0698-3220
A3A5R40	0698-3190	4	1	RESISTOR 100K .25% .125W F TC=0+-50	28480	0698-3190
A3A5R41	0698-3237	0	1	RESISTOR 5K .25% .125W F TC=0+-50	28480	0698-3237
A3A5R42	2100-1656	0		RESISTOR-TRMR 500 5% WW SIDE-ADJ 22-TRN	32997	3057P-1-501
A3A5R43	0811-2895	6	1	RESISTOR 422 .1% .2W PWW TC=0+-10	14140	1350-1/16-L3-422R-B
A3A5R44	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A3A5R45	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A5R46	0757-0458	7	9	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A5R47	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A5R48	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A5R49	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A5R50	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A5R51	0811-3356	6	1	RESISTOR 5.9K .1% .125W PWW TC=0+-5	28480	0811-3356
A3A5R52†	0698-6360	6	1	RESISTOR 10K .1% .125W F TC=0+-25	28480	0698-6360
A3A5R53	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A5R54	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A5R55	0811-3325	9	1	RESISTOR 312 .1% .125W PWW TC=0+-10	28480	0811-3325
A3A5R56	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A5R57	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A5R58	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A5R59	0698-3456	5	1	RESISTOR 287K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2873-F
A3A5R60	0698-3454	3	1	RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A3A5R61	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A3A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5U1	1826-0092	3		IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A3A5U2	1826-0261	8	4	IC OP AMP LOW-NOISE TO-99 PKG	28480	1826-0261
A3A5U3	1826-0261	8		IC OP AMP LOW-NOISE TO-99 PKG	28480	1826-0261
A3A5U4	1826-0261	8		IC OP AMP LOW-NOISE TO-99 PKG	28480	1826-0261
A3A5U5	1901-1011	8	3	DIODE-ARRAY VF DIFF=5MV	28480	1901-1011
A3A5U6	1901-1011	8		DIODE-ARRAY VF DIFF=5MV	28480	1901-1011
A3A5U7	1901-1011	8		DIODE-ARRAY VF DIFF=5MV	28480	1901-1011
A3A5U8	1820-0668	7	3	IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A3A5U9	1820-0668	7		IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A3A5U10	1820-0668	7		IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A3A5VR1†	1902-0692	1	1	DIODE-ZNR 6.3V 1% DO-7 PD=.4W TC=+.001%	28480	1902-0692
A3A5VR2	1902-0244	9	1	DIODE-ZNR 30V 5% PD=1W IR=5UA	28480	1902-0244
				A3A5 MISCELLANEOUS		
	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2		EXTRACTOR, P.C. BOARD	28480	5040-6843
A3A6	86701-60016	8	1	YTO DRIVER ASSEMBLY	28480	86701-60016
A3A6C1	0160-3451	1	7	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C2	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A3A6C3	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A6C4	0160-0574	3	6	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A6C5	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A6C6	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C7	0180-2139	2	1	CAPACITOR-FXD 10UF+-20% 60VDC TA	06001	69F177G7
A3A6C8	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C9	0160-3452	2	1	CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3452
A3A6C10	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A6C11	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C12	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C13	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A6C14	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A6C15	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3A6C16	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C17	0160-3460	2		CAPACITOR-FXD .05UF +80-20% 100VDC CER	28480	0160-3460
A3A6C18	0160-3451	1		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-3451
A3A6C19	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A6CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR2	1901-0040	1	19	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR4				NOT ASSIGNED		
A3A6CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR9	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR10	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A3A6CR11	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6Q1	1854-0237	7	1	TRANSISTOR NPN SI TO-66 PD=20W FT=10MHZ	28480	1854-0237
A3A6Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q3	1854-0022	8	2	TRANSISTOR NPN SI TO-39 PD=700MW	07263	S17843
A3A6Q4	1854-0232	2	1	TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A3A6Q5	1853-0038	4	1	TRANSISTOR PNP SI TO-39 PD=1W FT=100MHZ	28480	1853-0038
A3A6Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q7	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A6Q8	1854-0022	8		TRANSISTOR NPN SI TO-39 PD=700MW	07263	S17843
A3A6Q9	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A3A6Q10	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A6Q11	1853-0050	0	2	TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0050
A3A6Q12	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A3A6Q13	1853-0050	0		TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0050
A3A6R1				NOT ASSIGNED		
A3A6R2				NOT ASSIGNED		
A3A6R3	0757-0456	5	1	RESISTOR 43.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4322-F
A3A6R4	0698-4492	1	1	RESISTOR 32.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3242-F
A3A6R5	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A3A6R6	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A3A6R7	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A6R8	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A6R9	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A6R10	0757-0465	6	4	RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A3A6R11	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A6R12	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A6R13	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A6R14	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A6R15	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A6R16	0811-3440	9	1	RESISTOR 125 1% 25W PW TC=0+-2	28480	0811-3440
A3A6R17	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A3A6R18	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A6R19	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A6R20	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A6R21	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A6R22	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A6R23	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A6R24	0811-2936	6	1	RESISTOR 15 .1% .5W PWW TC=0+-5	14140	1251-1/4-C-15R-B
A3A6R25	2100-0635	3	2	RESISTOR-TRMR 2K 10% C SIDE-ADJ 20-TRN	28480	2100-0635
A3A6R26	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A6R27	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A6R28	0757-0467	8	2	RESISTOR 121K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1213-F
A3A6R29	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A6R30	0698-8025	4	1	RESISTOR 1.91K .25% .125W F TC=0+-50	19701	MF4C1/8-T2-1911-C
A3A6R31	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A3A6R32	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A6R33	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A6R34	2100-0635	3		RESISTOR-TRMR 2K 10% C SIDE-ADJ 20-TRN	28480	2100-0635
A3A6R35	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A3A6R36	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A6R37	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A6R38	0698-5673	2	1	RESISTOR 3.9K 1% .125W F TC=0+-25	28480	0698-5673
A3A6R39	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A6R40	0698-8420	3	1	RESISTOR 4.22K 1% .125W F TC=0+-25	19701	MF4C1/8-T9-4221-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A6R41	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A6R42	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A6TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6U1	1826-0092	3		IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A3A6VR1	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A3A6VR2	1902-3404	9		DIODE-ZNR 82.5V 5% DO-7 PD=.4W TC=+.082%	28480	1902-3404
A3A6VR3	1902-3323	1	1	DIODE-ZNR 42.2V 5% DO-35 PD=.4W TC=+.08%	28480	1902-3323
A3A6VR4	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
				A3A6 MISCELLANEOUS		
	1205-0085	8	1	HEAT SINK TO-66-CS	28480	1205-0085
	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2		EXTRACTOR, P.C. BOARD	28480	5040-6843
	2200-0107	6	2	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0143	0	2	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0003	8	4	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0003
	2260-0001	5	4	NUT-HEX-DBL-CHAM 4-40-THD .094-IN-THK	28480	2260-0001
A3A7	86701-60017	9	1	FM DRIVER ASSEMBLY	28480	86701-60017
A3A7C1	0160-0578	7	4	CAPACITOR-FXD .047UF +-1% 50VDC	28480	0160-0578
A3A7C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C3	0160-0578	7		CAPACITOR-FXD .047UF +-1% 50VDC	28480	0160-0578
A3A7C4	0160-0573	2	1	CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A3A7C5	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A7C6	0160-3874	2	4	CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A3A7C7	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A7C8	0160-4298	6		CAPACITOR-FXD 4700PF +-20% 250VDC CER	56289	C067F251H472MS22-CDH
A3A7C9	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A7C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C11	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A7C12	0160-0174	9	1	CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A3A7C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C14	0180-0491	5		CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A3A7C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A7C16	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A7C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C18	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A7C19*†	0160-0134	1	1	CAPACITOR-FXD 220PF +-5% 300VDC MICA *FACTORY SELECTED PART	28480	0160-0134
A3A7C20†	0160-3533	0	1	CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A3A7C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A7C22	0160-0158	9	1	CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A3A7C23†	0180-1719	2	1	CAPACITOR-FXD 22UF+-10% 25VDC TA	06001	69F146GB
A3A7C24	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C26	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A7C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C28	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A7C29	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A7C30	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A7C31	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C33	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A7C34	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A7C35	0180-0234	4	1	CAPACITOR-FXD 33UF+-20% 75VDC TA	06001	69F286G7
A3A7C36	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A7C37	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C38	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C39	0180-0491	5		CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A3A7C40	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C41	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A7C42	0160-2202	8	1	CAPACITOR-FXD 75PF +-5% 300VDC MICA	28480	0160-2202
A3A7C43	0140-0194	1	2	CAPACITOR-FXD 110PF +-5% 300VDC MICA	72136	DM15F111J0300WV1CR
A3A7C44	0160-3872	0	1	CAPACITOR-FXD 2.2PF +-.25PF 200VDC CER	28480	0160-3872
A3A7C45	0160-0578	7		CAPACITOR-FXD .047UF +-1% 50VDC	28480	0160-0578
A3A7C46	0160-0578	7		CAPACITOR-FXD .047UF +-1% 50VDC	28480	0160-0578
A3A7C47	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A7C48*	0160-2248	2	1	CAPACITOR-FXD 4.3PF +-.25PF 500VDC CER *FACTORY SELECTED PART	28480	0160-2248

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A7C49	0160-3491	9	1	CAPACITOR-FXD .47UF +-20% 50VDC CER	28480	0160-3491
A3A7C50	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A3A7CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7K1	0490-0564	0	2	RELAY-REED 1C 350MA 70VAC 5VDC-COIL 10VA	28480	0490-0564
A3A7K2	0490-0564	0		RELAY-REED 1C 350MA 70VAC 5VDC-COIL 10VA	28480	0490-0564
A3A7L1	9100-2259	8		INDUCTOR RF-CH-MLD 1.5UH 10% .105DX.26LG	28480	9100-2259
A3A7Q1	1854-0013	7	1	TRANSISTOR NPN 2N2218A SI TO-5 PD=800MW	04713	2N2218A
A3A7Q2	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A3A7Q3†	1854-0401	7	1	TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0401
A3A7Q4	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A7Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A7Q6	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A7Q7	1854-0023	9	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0023
A3A7Q8	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A7Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A7Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A7Q11	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A7Q12	1855-0020	8	1	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A3A7Q13	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A3A7Q14	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A7Q15	1855-0417	7	1	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0417
A3A7R1	0757-0447	4	3	RESISTOR 16.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1622-F
A3A7R2	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A7R3	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A3A7R4	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A3A7R5	0698-7277	6	1	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A3A7R6	0698-7258	3	1	RESISTOR 8.25K 1% .05W F TC=0+-100	24546	C3-1/8-T0-8251-F
A3A7R7	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A7R8	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A3A7R9	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A3A7R10	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A7R11	0698-3432	7	1	RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A3A7R12				NOT ASSIGNED		
A3A7R13	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A7R14				NOT ASSIGNED		
A3A7R15	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R16	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R17	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R18	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R19	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R20	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R21	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A7R22	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A7R23	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A7R24	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A3A7R25				NOT ASSIGNED		
A3A7R26	0698-7276	5	2	RESISTOR 46.4K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4642-F
A3A7R27	0698-7276	5		RESISTOR 46.4K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4642-F
A3A7R28	2100-3353	8	1	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A3A7R29	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A7R30	0683-1555	0	2	RESISTOR 1.5M 5% .25W FC TC=-900/+1100	01121	CB1555
A3A7R31	0698-4414	7	2	RESISTOR 158 1% .125W F TC=0+-100	24546	C4-1/8-T0-158R-F
A3A7R32	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A7R33	0698-7271	0	1	RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A3A7R34	0698-7283	4	1	RESISTOR 90.9K 1% .05W F TC=0+-100	24546	C3-1/8-T0-9092-F
A3A7R35	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A7R36	0698-7272	1	1	RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3162-F
A3A7R37	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A7R38	0757-0316	6	1	RESISTOR 42.2 1% .125W F TC=0+-100	24546	C4-1/8-T0-42R2-F
A3A7R39	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A7R40	2100-3354	9	1	RESISTOR-TRMR 50K 10% C SIDE-ADJ 1-TRN	28480	2100-3354
A3A7R41	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A7R42†	0698-3153	9	3	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A3A7R43†	0698-3152	8	2	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A7R44	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A7R45	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A7R46	2100-3350	5	1	RESISTOR-TRMR 200 10% C S10E-ADJ 1-TRN	28480	2100-3350
A3A7R47†	0757-0420	3	6	RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A7R48	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R49	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A7R50	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R51	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R52†	0698-3155	1	10	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A7R53	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A7R54	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A7R55†	0698-3443	0	7	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A7R56	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A3A7R57	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A7R58	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A7R59	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A3A7R60	0757-0447	4		RESISTOR 16.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1622-F
A3A7R61*†	0698-0083	8	14	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A7R62	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A7R63	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A3A7R64				NOT ASSIGNED		
A3A7R65*†	0757-0438	3	21	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A7R66	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A3A7R67*†	0698-3437	2	1	RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A3A7R68	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A3A7R69	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A3A7R70	0757-0424	7	2	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A3A7R71†	0686-1525	0	1	RESISTOR 1.5K 5% .5W CC TC=0+647	01121	EB1525
A3A7R72	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R73†	0757-0802	5	2	RESISTOR 162 1% .5W F TC=0+-100	28480	0757-0802
A3A7R74	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A7R75*†	0698-6113	7	1	RESISTOR 1.82K .25% .125W F TC=0+-100	28480	0698-6113
A3A7R76				NOT ASSIGNED		
A3A7R77†	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A7R78†	0757-0802	5		RESISTOR 162 1% .5W F TC=0+-100	28480	0757-0802
A3A7R79	0698-3452	1	1	RESISTOR 147K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1473-F
A3A7R80	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A7R81	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A3A7R82	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A3A7R83	0683-1555	0		RESISTOR 1.5M 5% .25W FC TC=-900/+1100	01121	CB1555
A3A7R84	0698-4414	7		RESISTOR 158 1% .125W F TC=0+-100	24546	C4-1/8-T0-158R-F
A3A7R85	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A7R86	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A3A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A7TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A7U1	1826-0261	8		IC OP AMP LOW-NOISE TO-99 PKG	28480	1826-0261
A3A7U2	1826-0081	0	1	IC OP AMP WB TO-99 PKG	27014	LM318H
A3A7U3	1826-0044	5	2	IC OP AMP GP DUAL 14-DIP-C PKG	07263	UA739DC
				A3A7 MISCELLANEOUS		
	1205-0011	0	4	HEAT SINK TO-5/TO-39-CS	28480	1205-0011
	1205-0037	0	2	HEAT SINK TO-18-CS	28480	1205-0037
	1200-0173	5	6	INSULATOR-XSTR DAP-GL	28480	1200-0173
	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
	5040-6843	2		EXTRACTOR, P.C. BOARD	28480	5040-6843
A3A8†	86701-60083	9	1	10MHZ REFERENCE OSCILLATOR ASSEMBLY	28480	86701-60083
A3A8MP1†	86701-00043	5		SUPPORT-TOP MOUNT (SUPPORT BRACKET FOR 86701-60074 OR 86701-60083).	28480	86701-00043
A3A8MP2†				NOT ASSIGNED		
A3A8P1				NSR, P/O A3A8		
A3A8W1				NSR, P/O A3A8		
A3A9	86701-60026	0	1	YTO LOOP ASSEMBLY	28480	86701-60026
A3A9C1	0160-3036	8	6	CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
A3A9C2	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
A3A9C3	0160-4748	1	3	CAPACITOR-FDTHRU 1000PF 20% 200V CER	28480	0160-4748
A3A9C4	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
A3A9C5	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
A3A9C6	0160-4748	1		CAPACITOR-FDTHRU 1000PF 20% 200V CER	28480	0160-4748
A3A9C7	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
A3A9C8	0160-4748	1		CAPACITOR-FDTHRU 1000PF 20% 200V CER	28480	0160-4748
A3A9C9	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9J1†	1250-0691	7	6	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9J2†	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9J3†	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9J4†	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9J5†	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9J6†	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0691
A3A9U1	5086-7097	6	1	SAMPLER, 2-6.5 GHZ	28480	5086-7097
A3A9W1†	86701-20064	2	1	CABLE ASSEMBLY, YTO OUTPUT	28480	86701-20064
A3A9W2†	86701-20066	4	1	CABLE ASSEMBLY, ATTENUATOR OUTPUT	28480	86701-20066
A3A9W3†	86701-20065	3	1	CABLE ASSEMBLY, FILTER INPUT	28480	86701-20065
A3A9W4	86701-60052	2	1	CABLE ASSEMBLY, COAX, BLACK	28480	86701-60052
				A3A9 MISCELLANEOUS		
	0590-0578	8	1	THREADED INSERT-STDF 2-56 .196-IN-LG SST	28480	0590-0578
	1250-1142	5	1	WASHER-LK INTL T 1/2 IN .26-IN-ID	28480	1250-1142
	1250-1143	6	1	NUT-RF CONN,SERIES SMA,HEX,1/4-36 THRD	16179	1707
	1400-0024	9	1	CLAMP-CABLE .25-DIA .5-WD NYL	28480	1400-0024
	2360-0331	6	4	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	28480	2360-0331
	2360-0332	7	1	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	28480	2360-0332
	3050-0227	3	3	WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
	6960-0016	0	1	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL	28480	6960-0016
	86701-00058	2	1	DECK-YTO PHASE LOCK	28480	86701-00058
	86701-00010	6	1	COVER, SAMPLER	28480	86701-00010
	86701-00011	7	1	COVER, PHASE LOCK	28480	86701-00011
	86701-00054	8	1	SPACER, SAMPLER	28480	86701-00054
	86701-20009	5	1	HOUSING, CASTING	28480	86701-20009
	86701-40001	9		EXTRACTOR, P.C. BOARD	28480	86701-40001
A3A9A1†	0955-0098	1	1	DIRECTIONAL COUPLER ASSEMBLY	28480	0955-0098
A3A9A2	86701-20025	5	1	ASSEMBLY, YTO INTERCONNECT	28480	86701-20025
A3A9A2J1	1250-0543	8	1	CONNECTOR-RF SM-SNP M PC 50-OHM	28480	1250-0543
A3A9A2W1	86701-60010	2	1	CABLE ASSEMBLY, YTO LOOP RIBBON	28480	86701-60010
A3A9A2W2	86701-60009	9	1	CABLE ASSEMBLY, YTO LOOP RIBBON	28480	86701-60009
	5086-7131	9	1	2-6.2 GHZ YTO ASSEMBLY	28480	5086-7131
A3A9A3	5086-6131	7	1	2-6.2 GHZ YTO ASSEMBLY (RESTORED 5086-7131)	28480	5086-6131
A3A9A4	~~86701-60024~~	8	1	ASSEMBLY, YTO PHASE DETECTOR	28480	86701-60024
A3A9A4C1	0160-2307	4	2	CAPACITOR-FXD 47PF +-5% 300VDC MICA	28480	0160-2307
A3A9A4C2	0160-2307	4		CAPACITOR-FXD 47PF +-5% 300VDC MICA	28480	0160-2307
A3A9A4C3	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A9A4C4	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A9A4C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A4C6	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A9A4C7				NOT ASSIGNED		
A3A9A4C8				NOT ASSIGNED		
A3A9A4C9	0160-3538	5	2	CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A3A9A4C10	0160-3538	5		CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A3A9A4C11	0160-0165	8	1	CAPACITOR-FXD .056UF +-10% 200VDC POLYE	28480	0160-0165
A3A9A4C12	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A9A4C13	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A3A9A4C14	0160-2453	1	1	CAPACITOR-FXD .22UF +-10% 80VDC POLYE	28480	0160-2453
A3A9A4C15	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A4C16	0160-0168	1	1	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A9A4C17	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A4C18	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A4C19	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A9A4C20	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A9A4C21	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A9A4C22	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A4C23	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A3A9A4C24	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A9A4C25	0140-0190	7		CAPACITOR-FXD 39PF +-5% 300VDC MICA	72136	DM15E390J0300WV1CR
A3A9A4C26	0160-3490	8	1	CAPACITOR-FXD 1UF +-20% 50VDC CER	28480	0160-3490
A3A9A4C27	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A9A4C28	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A9A4C29	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A9A4C30	0160-2200	6	1	CAPACITOR-FXD 43PF +-5% 300VDC MICA	28480	0160-2200
A3A9A4C31	0160-2264	2	1	CAPACITOR-FXD 20PF +-5% 500VDC CER 0+-30	28480	0160-2264
A3A9A4C32	0140-0194	1		CAPACITOR-FXD 110PF +-5% 300VDC MICA	72136	DM15F111J0300WV1CR
A3A9A4C33	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A4CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR3	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A3A9A4CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR5	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A3A9A4CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR8				NOT ASSIGNED		
A3A9A4CR9				NOT ASSIGNED		
A3A9A4CR10†				NOT ASSIGNED		
A3A9A4CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A3A9A4CR12	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR13	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4CR14	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9A4L1	9100-2254	3		INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A3A9A4L2	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A3A9A4L3	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A3A9A4L4	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A9A4L5	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A3A9A4L6	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5% .166DX.385LG	28480	9100-1641
A3A9A4L7	9100-0368	6		INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A3A9A4L8	9140-0179	1	2	INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A3A9A4L9	9100-2254	3		INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A3A9A4L10	9100-0368	6		INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A3A9A4L11	9140-0179	1		INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A3A9A4Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A9A4Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A9A4Q3	1855-0395	0	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645
A3A9A4Q4	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A3A9A4Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A9A4R1	0698-7288	9	1	RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A3A9A4R2	0757-0464	5	1	RESISTOR 90.9K 1% .125W F TC=0+-100	24546	C4-1/8-T0-9092-F
A3A9A4R3	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A9A4R4	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A9A4R5	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A9A4R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A9A4R7	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A9A4R8	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A9A4R9	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A9A4R10	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A9A4R11	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A3A9A4R12	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A9A4R13	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A9A4R14	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A9A4R15	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A9A4R16	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A9A4R17	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A9A4R18	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A9A4R19	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A9A4R20*	0757-0421	4	9	RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A9A4R21	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A3A9A4R22	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A9A4R23				NOT ASSIGNED		
A3A9A4R24	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A9A4R25	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A9A4R26	0698-4020	1	1	RESISTOR 9.53K 1% .125W F TC=0+-100	24546	C4-1/8-T0-9531-F
A3A9A4R27	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A9A4R28	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A9A4R29	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A4R30	2100-3212	8	1	RESISTOR-TRMR 200 10% C TOP-ADJ 1-TRN	28480	2100-3212
A3A9A4R31	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A9A4R32	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A3A9A4R33	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A9A4R34	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A9A4R35	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A9A4R36	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A9A4R37†	0757-0422	5	9	RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A9A4R38†	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A9A4R39	0757-0467	8		RESISTOR 121K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1213-F
A3A9A4R40				NOT ASSIGNED		
A3A9A4R41				NOT ASSIGNED		
A3A9A4R42				NOT ASSIGNED		
A3A9A4R43	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A3A9A4R44	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A9A4R45	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A4R46	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A3A9A4R47	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A9A4R48	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A3A9A4R49	0757-0439	4		RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A3A9A4R50	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A9A4R51	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A9A4R52	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A9A4R53	2100-1986	9	1	RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	73138	82PR1K
A3A9A4R54†	0698-7245	8	1	RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A9A4R55†	0698-7242	5	1	RESISTOR 1.78K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1781-F
A3A9A4R56	0698-7253	8	1	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A3A9A4R57†	0757-0418	9	3	RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A3A9A4R58	0698-3451	0	1	RESISTOR 133K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1333-F
A3A9A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9A4U1	1826-0092	3		IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A3A9A4U2	1826-0026	3	1	IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A3A9A4U3	1826-0044	5		IC OP AMP GP DUAL 14-DIP-C PKG	07263	UA739DC
A3A9A4U4	1820-1423	4	1	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A3A9A4U5	1820-1344	8		IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A9A4U6	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A9A4U7	1820-0817	8	2	IC FF ECL D-M/S DUAL	04713	MC10131P
A3A9A4U8	1810-0204	6		NETWORK-RES 8-SIP1.0K OHM X 7	01121	208A102
A3A9A4U9	1820-0817	8		IC FF ECL D-M/S DUAL	04713	MC10131P
A3A9A5	86701-60023	7	1	ASSEMBLY, SAMPLER	28480	86701-60023
A3A9A5C1	0121-0046	2	2	CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A3A9A5C2	0121-0046	2		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A3A9A5C3	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A9A5C4	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A9A5C5	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C6	0160-2150	5	1	CAPACITOR-FXD 33PF +-5% 300VDC MICA	28480	0160-2150
A3A9A5C7	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A9A5C9	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A9A5C10†	0160-2265	3	1	CAPACITOR-FXD 22PF +-5% 500VDC CER 0+-30	28480	0160-2265
A3A9A5C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A9A5C12	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C13	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A3A9A5C14	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C15	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A5C17	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C18	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A9A5C19	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A5C20	0160-0939	4	1	CAPACITOR-FXD 430PF +-5% 300VDC MICA	28480	0160-0939
A3A9A5C21	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C22	0160-2205	1	1	CAPACITOR-FXD 120PF +-5% 300VDC MICA	28480	0160-2205
A3A9A5C23	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C24	0140-0193	0		CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A9A5C25	0140-0193	0		CAPACITOR-FXD 82PF +-5% 300VDC MICA	72136	DM15E820J0300WV1CR
A3A9A5C26	0160-2308	5	1	CAPACITOR-FXD 36PF +-5% 300VDC MICA	28480	0160-2308
A3A9A5C27	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C28	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C29	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A5C30	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A5C31	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A9A5C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9A5E1†				NOT ASSIGNED		
A3A9A5L1				NSR, P/O CIRCUIT BOARD		
A3A9A5L2	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A9A5L3	9100-1623	8	1	INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A3A9A5L4	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A9A5L5	9100-2258	7	2	INDUCTOR RF-CH-MLD 1.2UH 10% .105DX.26LG	28480	9100-2258
A3A9A5L6	9100-2258	7		INDUCTOR RF-CH-MLD 1.2UH 10% .105DX.26LG	28480	9100-2258
A3A9A5L7	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10% .105DX.26LG	28480	9100-2891
A3A9A5L8				NSR, P/O CIRCUIT BOARD		
A3A9A5L9				NSR, P/O CIRCUIT BOARD		
A3A9A5L10	9140-0143	9		INDUCTOR RF-CH-MLD 3.3UH 10% .105DX.26LG	28480	9140-0143

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A5L11	9100-0368	6		INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A3A9A5L12	9100-2249	6		INDUCTOR RF-CH-MLD 150NH 10% .105DX.26LG	28480	9100-2249
A3A9A5L13	9100-2250	9	1	INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A3A9A5L14	9100-2249	6		INDUCTOR RF-CH-MLD 150NH 10% .105DX.26LG	28480	9100-2249
A3A9A5Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A3A9A5Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q3	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A9A5Q4†	1855-0254	0	1	TRANSISTOR MOSFET N-CHAN E-MODE	28480	1855-0254
A3A9A5Q5	1853-0015	7		TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
A3A9A5Q6	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q8	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A3A9A5R1	2100-3383	4	1	RESISTOR-TRMR 50 10% C TOP-ADJ 1-TRN	28480	2100-3383
A3A9A5R2	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A5R3	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A3A9A5R4	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A3A9A5R5	0757-0424	7		RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A3A9A5R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A9A5R7	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A3A9A5R8	0757-0796	6	1	RESISTOR 82.5 1% .5W F TC=0+-100	28480	0757-0796
A3A9A5R9	0757-0399	5		RESISTOR 82.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-82R5-F
A3A9A5R10	0698-3457	6	1	RESISTOR 316K 1% .125W F TC=0+-100	28480	0698-3457
A3A9A5R11	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1623-F
A3A9A5R12	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A3A9A5R13	0698-7216	3	1	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A3A9A5R14	0757-0447	4		RESISTOR 16.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1622-F
A3A9A5R15	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A3A9A5R16	0757-0398	4	1	RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A3A9A5R17	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A9A5R18	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A9A5R19	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A9A5R20	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A3A9A5R21	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A9A5R22	0698-7197	9	1	RESISTOR 23.7 1% .05W F TC=0+-100	24546	C3-1/8-T0-23R7-F
A3A9A5R23	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A3A9A5R24	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A9A5R25	0698-0082	7	2	RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A3A9A5R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A9A5R27	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A5R28	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A3A9A5R29	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A9A5R30	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A9A5R31	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A9A5R32	0698-3439	4	2	RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A3A9A5R33	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A9A5R34	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A9A5R35	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A3A9A5R36	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A5R37	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A5R38	0757-0276	7		RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A3A9A5R39	0757-0276	7		RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A3A9A5R40	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A9A5R41†	0698-7196	8	1	RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-21R5-F
				A3A9A5 MISCELLANEOUS		
	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	28480	1251-3172
A3A9A6	0955-0090	3	1	ATTENUATOR ASSEMBLY, 15 DB	28480	0955-0090
A3A9A7	9135-0040	4	1	6.2 GHZ LOW PASS FILTER ASSEMBLY	28480	9135-0040
A3A10	86701-60011	3	1	MOTHER BOARD ASSEMBLY	28480	86701-60011
A3A10CR1	1901-0159	3		DIODE-PWR RECT 400V 750MA DO-41	28480	1901-0159
A3A10CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A3A10CR3	1990-0517	4	1	LED-LAMP LUM-INT=3MCD IF=20MA-MAX BVR=5V	28480	5082-4655
A3A10J1				NSR, P/O A3W11		
A3A10J2	1251-3905	4	1	CONNECTOR 20-PIN M RECTANGULAR	28480	1251-3905
A3A10J3	86701-60069	1	1	CONNECTOR ASSEMBLY, 5-PIN	28480	86701-60069
A3A10J4	1251-0555	4	1	CONNECTOR-PC EDGE 30-CONT/ROW 2-ROWS	28480	1251-0555
A3A10K1	0490-0618	5	1	RELAY 2C 24VDC-COIL 5A 115VAC	28480	0490-0618

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A10R1	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A10R2	0687-3321	0	1	RESISTOR 3.3K 10% .5W CC TC=0+647	01121	EB3321
A3A10R3	0683-7515	4	1	RESISTOR 750 5% .25W FC TC=-400/+600	01121	CB7515
A3A10R4	0686-7525	2	1	RESISTOR 7.5K 5% .5W CC TC=0+647	01121	EB7525
A3A10R5	0683-2225	3	1	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
A3A10XA3A2	1251-2026	8	4	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A3A10XA3A3	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A3A10XA3A4	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A3A10XA3A5	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A3A10XA3A6	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A3A10XA3A7	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
				A3A10 MISCELLANEOUS		
	0380-0667	1	1	STANDOFF-HEX .312-IN-LG 6-32THD	28480	0380-0667
	0380-0076	6	4	SPACER-RVT-ON .5-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
	0380-0659	1	2	SPACER-RVT-ON .375-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
	0380-0884	4	5	STANDOFF-RVT-ON .156-IN-LG 4-40THD	00000	ORDER BY DESCRIPTION
	0590-0526	6		THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
	1251-2313	6		CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	28480	1251-2313
A3A11	86701-60070	4	1	POWER LINE MODULE(DOES NOT INCLUDE A3F1)	28480	86701-60070
A3A11TB1	5020-8122	2	1	LINE VOLTAGE SELECTOR CARD	28480	5020-8122

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				CHASSIS PARTS		
A3AT1	86701-60066	8	2	TERMINATION, 50 OHM	28480	86701-60066
A3AT2	86701-60066	8		TERMINATION, 50 OHM	28480	86701-60066
A3B1	~~3160-0296~~	9	1	FAN-SKL 72-CFM 115V 50/60-HZ 3.875-OD (EXCEPT OPTION 003)	28480	3160-0296
A3B1	3160-0298	1	1	FAN-SKL 72-CFM 115V 50/60/400-HZ (OPTION 003 ONLY)	28480	3160-0298
A3C1	0180-0452	8	1	CAPACITOR-FXD .013F+75-10% 25VDC AL	28480	0180-0452
A3C2	0180-0454	0	1	CAPACITOR-FXD 4200UF+75-10% 75VDC AL	28480	0180-0454
A3C3	0180-0453	9	1	CAPACITOR-FXD 8700UF+75-10% 40VDC AL	28480	0180-0453
A3C4†	0180-2798	9	1	CAPACITOR-FXD .03F+100-10% 20VDC AL	28480	0180-2798
A3C5	0170-0073	8	1	CAPACITOR-FXD 1UF +-10% 600VDC POLYE (OPTION 003 ONLY)	28480	0170-0073
A3C6	0160-4065	5	1	CAPACITOR-FXD .1UF +-20% 250VAC(RMS)	28480	0160-4065
A3F1	2110-0003	0		FUSE 3A 250V NTD 1.25X.25 UL (100/120 VAC)	75915	312003
A3F1	2110-0043	8		FUSE 1.5A 250V NTD 1.25X.25 UL (220/240 VAC)	28480	2110-0043
A3J1				NSR (P/O A3W11)		
A3J2				NSR (P/O A3W10)		
A3J3				NSR (P/O A3W10)		
A3J4				NOT ASSIGNED		
A3J5				NOT ASSIGNED		
A3J6†	08672-60132	9		CONNECTOR RF OUTPUT, OPT 004 ONLY	28480	08672-60132
	2950-0079	0	1	HEX NUT	28480	2950-0079
	2190-0120	0	1	LOCK WASHER	28480	2190-0120
A3J6				CONNECTOR RF OUTPUT, OPT 005 ONLY, NSR P/O A1W1		
A3J7	1250-0870	4	4	CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM (10 MHZ OUT)	28480	1250-0870
A3J8	1250-0870	4		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM (100 MHZ OUT)	28480	1250-0870
A3J9	1250-0870	4		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM (FREQ. STD. INT.)	28480	1250-0870
A3J10	1250-0870	4		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM (FREQ. STD. EXT.)	28480	1250-0870
A3Q1	1854-0618	8	2	TRANSISTOR NPN SI DARL TO-3 PD=150W	04713	MJ3000
A3Q2	1854-0294	6	1	TRANSISTOR NPN SI TO-3 PD=115W FT=500KHZ	28480	1854-0294
A3Q3	1854-0618	8		TRANSISTOR NPN SI DARL TO-3 PD=150W	04713	MJ3000
A3Q4	1854-0679	1	1	TRANSISTOR NPN 2N5885 SI TO-3 PD=200W	04713	2N5685
A3S1	3101-0070	3	1	SWITCH-SL DPDT MINTR .5A 125VAC/DC (FREQ. STD. INT/EXT SWITCH)	28480	3101-0070
A3T1	86701-60032	8	1	TRANSFORMER	28480	86701-60032
A3W1	86701-60046	4	1	CABLE ASSEMBLY,FM INPUT (BROWN)	28480	86701-60046
A3W2	86701-60007	7	1	CABLE ASSEMBLY,FREQ.STD.OUTPUT(GRA/VIO)	28480	86701-60007
A3W3	86701-60063	5	1	CABLE ASSEMBLY,FREQ. REF. (GRAY)	28480	86701-60063
A3W4	86701-60039	5	1	CABLE ASSEMBLY,YTM TUNE(YELLOW)	28480	86701-60039
A3W5	86701-60005	5	1	CABLE ASSEMBLY, 10 MHZ OUTPUT(GRA/BLU)	28480	86701-60005
A3W6	86701-60049	7	1	CABLE ASSEMBLY, 10 MHZ OUTPUT (BLUE)	28480	86701-60049
A3W7	86701-60004	4	1	CABLE ASSEMBLY, 100 MHZ OUTPUT(GRA/GRN)	28480	86701-60004
A3W8	68701-60053	5	1	CABLE ASSEMBLY,M/N OUTPUT(WHT/ORG)	28480	68701-60053
A3W9				NOT ASSIGNED		
A3W9	86701-60064	6	2	CABLE ASSEMBLY	28480	86701-60064
A3W10	86701-60064	6		CABLE ASSEMBLY-A1 TO A2 INTERCONNECT (INCLUDES A3J2 AND A3J3)	28480	86701-60064
A3W11	86701-60050	0	1	CABLE ASSEMBLY (A1 INTERCONNECT) (INCLUDES A3J1 AND A3A10J1)	28480	86701-60050
A3W12				NOT ASSIGNED		
A3W13	86701-60006	6	1	CABLE ASSEMBLY,FREQ.STD. INPT(GRA/BLK)	28480	86701-60006
A3W14	86701-60056	6	1	CABLE ASSEMBLY,20/30MHZ OUTPUT (GREEN)	28480	86701-60056
A3W15	86701-60033	9	1	CABLE ASSEMBLY,FM TUNE (VIOLET)	28480	86701-60033
A3W16	86701-60055	5	1	CABLE ASSEMBLY,YTO TUNE (GRAY)	28480	86701-60055
A3W17	86701-60054	4	1	CABLE ASSEMBLY,INTEGRATED FM OUT(WHITE)	28480	86701-60054
				A3 MISCELLANEOUS PARTS		
	0570-0632	3	1	SCREW-SPCL 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0360-0268	6	1	TERMINAL-SLDR LUG LK-MTG FOR-#6-SCR	28480	0360-0268
	0400-0001	1	1	GROMMET-RND .562-IN-ID .75-IN-GRV-OD	28480	0400-0001
	0400-0082	8	1	GROMMET-CHAN NCH .09-IN-GRV-WD	28480	0400-0082
	0510-0198	0	2	NUT-HEX-DBL-CHAM 0-80-THD .047-IN-THK	00000	ORDER BY DESCRIPTION
	0515-0095	6	1	SCREW-THUMB M3.5 X 0.6 6.35MM-LG	00000	ORDER BY DESCRIPTION

See introduction to this section for ordering information
*Indicates factory selected value
† Backdating information in Section VII.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
	0520-0166	3	10	SCREW-MACH 2-56 .375-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
	0590-0012	5	4	NUT-KNRLD-R 15/32-32-THD .062-IN-THK	00000	ORDER BY DESCRIPTION
	0590-0106	8	10	NUT-HEX-PLSTC LKG 2-56-THD .143-IN-THK	00000	ORDER BY DESCRIPTION
	0690-0092	7	6	TUBING-FLEX .192-ID TFE .016-WALL	00000	ORDER BY DESCRIPTION
	1200-0043	8	4	INSULATOR-XSTR ALUMINUM	28480	1200-0043
	1200-0147	3	8	INSULATOR-FLG-BSNG NYLON	28480	1200-0147
	1400-0510	8	1	CLAMP-CABLE .15-DIA .62-WD NYL	28480	1400-0510
	1400-0618	7	1	CABLE CLAMP-HFCL .125-DIA .5-WD	28480	1400-0618
	1400-0619	8	3	CABLE CLAMP-HFCL .312-DIA .5-WD	28480	1400-0619
	1400-0673	4	1	CLAMP-CABLE 2-DIA .5-WD SST	28480	1400-0673
	85660-20090	2	1	STEP WASHER	28480	85660-20090
	1520-0065	2	4	SHOCK MOUNT .5-EFF-MGT 6-LB-LOAD-CAP	28480	1520-0065
	1520-0094	7	3	ISOLATION MOUNT (EXCEPT OPTION 002)	28480	1520-0094
	2190-0004	9	6	WASHER-LK INTL T NO. 4 .115-IN-ID	28480	2190-0004
	2190-0007	2	2	WASHER-LK INTL T NO. 6 .141-IN-ID	28480	2190-0007
	2190-0011	8	8	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0011
	2190-0017	4	8	WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
	2190-0018	5	2	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
	2190-0019	6	4	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
	2190-0049	2	2	WASHER-LK HLCL NO. 0 .065-IN-ID	28480	2190-0049
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0105	4	1	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0111	2	8	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0141	8	4	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0151	0	2	SCREW-MACH 4-40 .75-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0153	2	4	SCREW-MACH 4-40 .875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0115	4	25	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0117	6	2	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0119	8	8	SCREW-MACH 6-32 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0197	2	2	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0219	9	2	SCREW-MACH 6-32 1.375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0333	8	14	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
	2510-0192	6	8	SCREW-MACH 8-32 .25-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
	2510-0195	9	8	SCREW-MACH 8-32 .375-IN-LG 100 DEG	28480	2510-0195
	2580-0002	4		NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
	2680-0129	8	8	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0035	8	5	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
	2950-0051	8		NUT-HEX-DBL-CHAM 1/4-28-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
	3030-0422	8	2	SCREW-SKT HD CAP 0-80 .188-IN-LG SST-302	00000	ORDER BY DESCRIPTION
	3050-0105	6	4	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
	3050-0227	3		WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
	7120-4296	7	1	LABEL-WARNING .688-IN-WD 1.5-IN-LG AL	28480	7120-4296
	7120-4477	6	1	LABEL-WARNING .45-IN-WD 7.5-IN-LG AL	28480	7120-4477
	7120-4439	0	1	LABEL, LINE MODULE	28480	7120-4439
	5040-0170	6	1	GUIDE:PLUG-IN PC BOARD	28480	5040-0170
	86701-00002	6	1	CHASSIS CONTROL	28480	86701-00002
	86701-00003	7	1	CHASSIS, RF MOD	28480	86701-00003
	86701-00004	8	1	SUPPORT, P.C. GUIDE	28480	86701-00004
	86701-00007	1	1	AIR FILTER	28480	86701-00007
	86701-00016	2	1	SUPPORT, CAPACITOR	28480	86701-00016
	86701-00017	3	1	DISK, FAN SHIELD	28480	86701-00017
	86701-00019	5	1	INSULATOR	28480	86701-00019
	~~86701-00057~~	1	1	DIVIDER CENTER, 21"	28480	86701-00057
	86701-00022	0	1	COVER, GUARD	28480	86701-00022
	86701-00024	2	1	SCOOP, AIR	28480	86701-00024
	86701-00027	5	1	PANEL, REAR	28480	86701-00027
	86701-00028	6	1	SPRING, FLAT	28480	86701-00028
	86701-00029	7	1	BAFFLE-AIR, TOP	28480	86701-00029
	86701-00030	0	1	BAFFLE-AIR, BOTTOM	28480	86701-00030
	86701-00038	8	1	STRUT ASSEMBLY, LEFT	28480	86701-00038
	86701-00039	9	1	STRUT ASSEMBLY, RIGHT	28480	86701-00039
	86701-00042	4	1	SUPPORT, MOUNT, BOTTOM	28480	86701-00042
	86701-00043	5	2	SUPPORT, MOUNT, TOP	28480	86701-00043
	86701-00044	6	4	SNUBBER	28480	86701-00044
	5021-3208	7	7	HOUSING, REFERENCE BLOCK	28480	5021-3208
	86701-20002	8	2	COWLING FAN	28480	86701-20002
	86701-20003	9	4	GUIDE PIN	28480	86701-20003
	86701-40004	2	1	HEAT SINK	28480	86701-40004
	86701-20005	1	1	GUIDE, REAR P.C.	28480	86701-20005
	86701-20006	2	1	GUIDE, FRONT P.C.	28480	86701-20006
	86701-20007	3	1	FRAME, REAR MOD	28480	86701-20007

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				ILLUSTRATED PARTS BREAKDOWN		
1	5001-0439	8	2	SIDE TRIM, FRONT FRAME W/O FRONT HANDLE	28480	5001-0439
2	5040-7220	1	2	STRAP, HANDLE, CAP-REAR	28480	5040-7220
3	0570-1170	6	4	RETAINER, SCREW FOR STRAP HANDLE	28480	0570-1170
4	5060-9938	4	2	COVER, PERFORATED SIDE	28480	5060-9938
5	5020-8883	2	4	STRUT, CORNER 21"	28480	5020-8883
6	86701-20007	3	1	FRAME, READ MOD	28480	86701-20007
7	5040-7221	2	4	STANDOFF, REAR PANEL	28480	5040-7221
8	0570-1171	7	2	CAPTIVE SCREW(USE WITH TOP & BOTTOM COVERS;SEE ALSO ITEM 9)	00000	ORDER BY DESCRIPTION
9	0510-0043	4	2	CLIP(USE WITH TOP & BOTTOM COVERS; SEE ALSO ITEM 8)	28480	0510-0043
10	5060-9836	1	1	COVER, TOP 21"	28480	5060-9836
11	5040-7202	9	1	TRIM, TOP	28480	5040-7202
12	5001-0432	1	1	GUSSET, SIDE	28480	5001-0432
13	5060-9805	4	1	STRAP, HANDLE 21"	28480	5060-9805
14	5020-8803	6	1	FRONT FRAME	28480	5020-8803
15	86701-20001	7	1	DIVIDER FRAME, FRONT	28480	86701-20001
16	5040-7201	8	4	FOOT, FULL 1/2 MOD.	28480	5040-7201
17	5060-9848	5	1	COVER, BOTTOM 21"	28480	5060-9848
18	1460-1345	5	2	TILT STAND SST (TILT STAND)	28480	1460-1345
19	5040-7219	8	2	STRAP, HANDLE, CAP-FRONT	28480	5040-7219

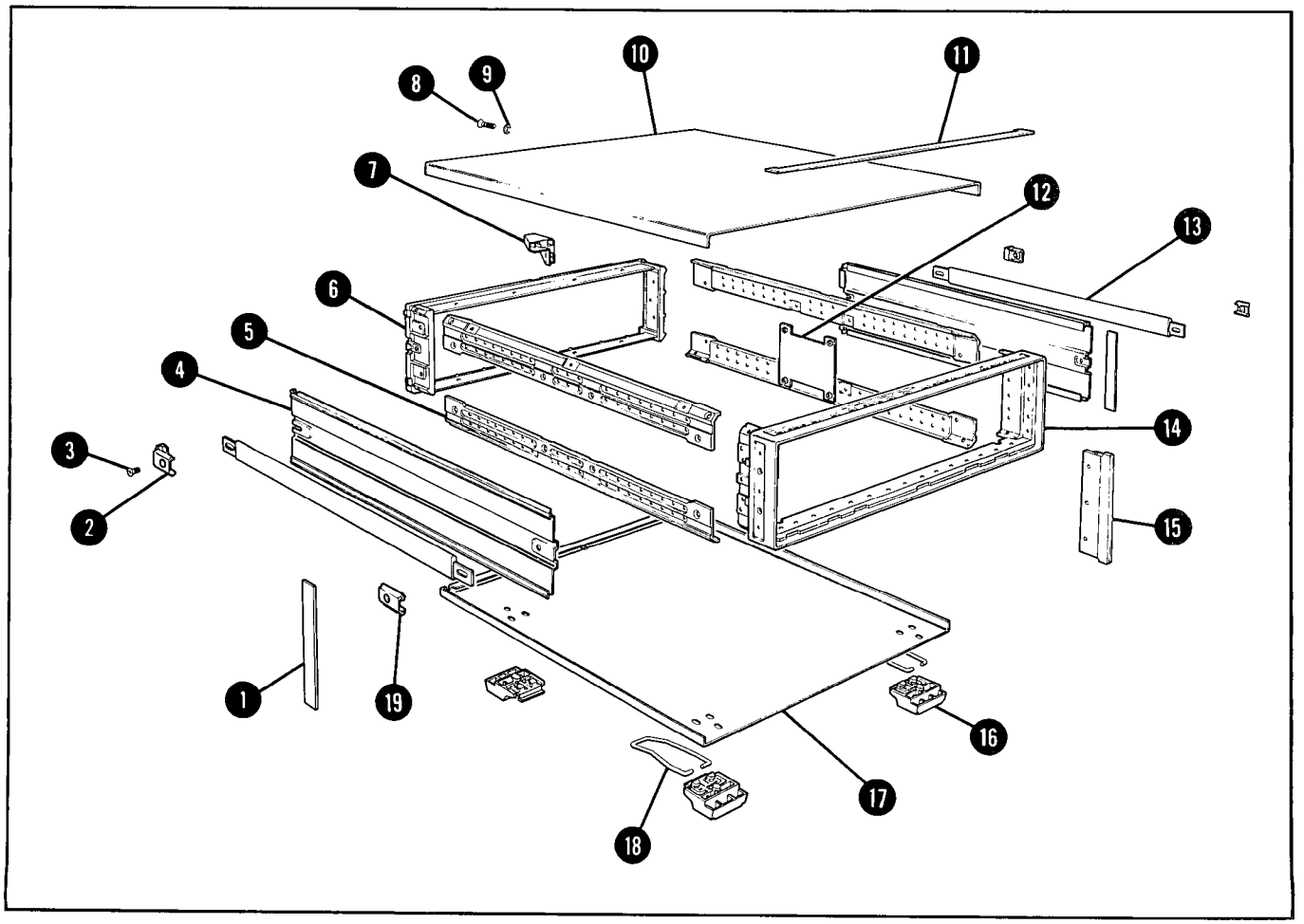


Figure 6-2. Synthesizer Cabinet Parts

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				8672A CHASSIS/MISCELLANEOUS PARTS		
W1	8120-1378	1	1	CABLE ASSY 18AWG 3-CNDCT JCK-JKT	28480	8120-1378
A3W18†	5060-9462	9	1	ADAPTER-HP-IB	28480	5060-9462
				MISCELLANEOUS PARTS		
	2680-0108	5	4	SCREW-MACH 10-32 .375-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
	08640-60036	4	1	BOARD ASSEMBLY, EXTENDER	28480	08640-60036
	08672-20033	5	1	WINDOW CONTROLLER	28480	08672-20033
	08672-20077	7	1	WINDOW, RF	28480	08672-20677
	1460-0553	5	1	STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
	1494-0017	7	1	STANDARD SLIDE KIT	28480	1494-0017
	5040-6927	3	1	DIVIDER STRIP	28480	5040-6927

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII.

Table 6-4. Code List of Manufacturers

Mfr Code	Manufacturer Name	Address		Zip Code
00000	ANY SATISFACTORY SUPPLIER	VINELAND	NJ	08360
00115	ACE GLASS INC	MILWAUKEE	WI	53204
01121	ALLEN-BRADLEY CO	LAWNDALE	CA	90260
01281	TRW INC SEMICONDUCTOR DIV	DALLAS	TX	75222
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	CITY OF IND	CA	91745
02111	SPECTROL ELECTRONICS CORP	AUBURN	NY	13201
03508	GE CO SEMICONDUCTOR PROD DEPT	WHIPPANY	NJ	07981
03888	K D I PYROFILM CORP	PHOENIX	AZ	85008
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	WAKEFIELD	MA	01880
05820	WAKEFIELD ENGINEERING INC	COLUMBIA	SC	29063
06001	MEPCO ELECTRA CORP	TINLEY PARK	IL	60477
06383	PANDUIT CORP	SANTA CLARA	CA	95050
06665	PRECISION MONOLITHICS INC	VAN NUYS	CA	91401
07088	KELVIN ELECTRIC CO	MOUNTAIN VIEW	CA	94042
07263	FAIRCHILD SEMICONDUCTOR DIV	SHELTON	CT	06484
07707	USM CORP USM FASTENER DIV	MOUNTAIN VIEW	CA	94040
1F556	PRECISION LAMP INC	MANCHESTER	NH	03130
14140	EDISON ELEK DIV MCGRAW-EDISON	FARMINGTON	MI	03054
16179	OMNI SPECTRA INC	SANTA CLARA	CA	95054
17856	SILICONIX INC	SUNNYVALE	CA	94086
18324	SIGNETICS CORP	MINERAL WELLS	TX	76067
19701	MEPCO/ELECTRA CORP	SAN DIEGO	CA	92129
20932	EMCON DIV ITW	EL MONTE	CA	91731
20940	MICRO-OHM CORP	WAKEFIELD	MA	01880
24046	TRANSITRON ELECTRONIC CORP	NORWOOD	MA	02062
24355	ANALOG DEVICES INC	BRADFORD	PA	16701
24546	CORNING GLASS WORKS (BRADFORD)	GREENWOOD	IN	46227
24931	SPECIALTY CONNECTOR CO INC	SANTA CLARA	CA	95051
27014	NATIONAL SEMICONDUCTOR CORP	PALO ALTO	CA	94304
28480	HEWLETT-PACKARD CO CORPORATE HQ	SOMERVILLE	NJ	
3L585	RCA CORP SOLID STATE DIV	SAN DIEGO	CA	92121
30983	MEPCO/ELECTRA CORP	RIVERSIDE	CA	92507
32997	BOURNS INC TRIMPOT PROD DIV	SANTA ANA	CA	92705
52648	PLESSEY SEMICONDUCTORS	CHATTANOOGA	TN	13035
52763	STETTNER ELECTRONICS INC	SELMA	NC	27576
54294	SHALLCROSS INC	NORTH ADAMS	MA	01247
56289	SPRAGUE ELECTRIC CO	FLORENCE	SC	06226
72136	ELECTRO MOTIVE CORP	ERIE	PA	16512
72982	ERIE TECHNOLOGICAL PRODUCTS INC	FULLERTON	CA	92634
73138	BECKMAN INSTRUMENTS INC HELIPOT DIV	WASECA	MN	56093
74970	JOHNSON E F CO	PHILADELPHIA	PA	19108
75042	TRW INC PHILADELPHIA DIV	DES PLAINES	IL	60016
75915	LITTELFUSE INC	BROADVIEW	IL	60153
9D949	AMPHENOL SALES DIV OF BUNKER-RAMO	COLUMBUS	NE	68601
91637	DALE ELECTRONICS INC	MAMARONECK	NY	10544
98291	SEALECTRO CORP			

SECTION VII
MANUAL CHANGES

7-1. INTRODUCTION

7-2. This section contains manual change instructions for backdating this manual for HP Model 8672A Synthesized Signal Generators having serial number prefixes lower than 2229A. This section also contains instrument modification suggestions and procedures that are recommended to improve the performance and reliability of your generator.

7-3. MANUAL CHANGES

7-4. To adapt this manual to your instrument, refer to Table 7-1 and make all of the manual changes listed opposite your instrument's serial number prefix. The manual changes are listed in serial number prefix sequence and should be made in the sequence listed. Table 7-2 is a summary of changes by component.

7-5. If your instrument's serial number prefix is not listed on the title page of this manual or in Table 7-1, it may be documented in a MANUAL CHANGES supplement. For additional important information about serial number coverage, refer to INSTRUMENTS COVERED BY MANUAL in Section I.

Table 7-1. Manual Changes by Serial Number Prefix

Serial Prefix or Number	Make Manual Changes
1610A	AX — A
1701A	AX — B
1702A	AX — C
1703A	AX — D, A
1704A	AX — D
1705A	AX — F
1706A	AX — G
1707A	AX — J
1708A	AX — J, H, G
1711A	AX — K
1712A	AX — K, H, G
1719A	AX — I, G
1725A	AX — L
1731A	AX — M
1732A	AX — N
1733A	AX — O
1801A	AX — P
1816A	AX — Q
1821A	AX — R
1822A	AX — S
1831A	AX — T
1833A	AX — U
1834A	AX — V
1841A	AX — W
1845A	AX — X
1905A	AX — Y
1906A	AX — Z
1913A	AX — AA
1914A	AX — AB
1930A	AX — AC
1940A	AX — AD
2002A	AX — AE
2005A	AX — AF
2006A	AX — AG
2007A	AX — AH, AF
2008A	AX — AI, AF
2010A	AX — AI
2012A	AX — AJ
2014A	AX — AJ, AF
2016A	AX — AK
2017A	AX — AK, AF
2018A	AX — AL
2019A	AX — AM
2020A	AX — AN
2034A	AX — AO
2037A	AX — AP
2039A	AX — AP, AN
2040A	AX — AQ
2101A	AX — AS, AP
2102A	AX — AR, AP
2103A	AX — AS, AQ
2104A	AX — AS
2105A	AX — AR
2114A	AX — AT
2115A	AX — AT, AQ
2126A	AX - AT, AQ, AP
2132A	AX — AU, AQ
2133A	AX — AU
2207A	AX — AV, AQ
2208A	AX — AV
2210A	AX, AW, AQ
2211A	AX, AW
2220A	AX, AQ
2221A	AX

Table 7-2. Summary of Manual Changes by Page Number (1 of 2)

Page	Description	Changes
1-2	Freq. Switching Time	S
1-2	Spectral Purity	W
1-4	Freq. Mod.	I
1-4	Residual FM	AV
4-16	FM Freq. Response	I
4-22	Spectral Purity	W
4-23	Note	W
4-23	Steps 6,8	W
4-24	Steps 10-20	W
4-25	Step 22	W
4-25	FM Freq. Response	I
4-29	SPEC.	AV
4-30	Para. 4-23, Steps 6-13	AV
4-35	SPEC.	AV
4-48	Para. 4-20	W
4-48	Para. 4-21	I
5-2	A2A8C7	AX
	A3A1A1R51, R75,VR2, TP1,Y1	G
6-5	A1A1C3	Y
6-6	A1A3A1R1,R2, R10,11	AK
6-7	A1A5CR6	AC
	A1A5L4,Q1	AE
	A1A5R12,13, R15,16	AI
	A1A5R31	Q
	A1A5R35	AE
6-8	A1A5R36	Q
	A1A5R68,69	P
	A1A5R75	AE
	A1A6	AD,S
6-9	A1A6C27-30	S
	A1A6Q10	S
	A1A6R58-74	S
	A1A6R75	AD
6-10	A1A6R69	AH
	A1A6TP7	S
	A1A6U9-11	S
	A1A6VR2-4	S
6-17	A1A11	AW
	A1A11R27	AW
6-18	A1A11U8	AI
	A1A11U11	AW
	A1A12	AK
	A1A14	AW,AL
	A1DS2,3	AX
6-20	A1J1	AM
6-21	A1W8	AX,AM
	A1W10	AK
6-23	A2A1C1	J
	A2A1C2	AB
	A2A1R25	AG
6-24	A2A3	AP
	A2A3C12	J
6-25	A2A3MP1	AP
	A2A3R34	J
6-26	A2A4	AP
	A2A4MP1	AP
	A2A4R23	X
	A2A4R32	AN
6-27	A2A5	AP
	A2A5MP1	AP
6-30	A2A8	AT
	A2A8C7	AX
	A2A8U12-14, U22,23	AT
6-31	A2A8XU23	AX
6-32	A2A10	AW,AT
	A2A10R13,21	AW
6-33	A2A10U24	AW,U
	A2A10U25	AT
	A2A10U26,27	AW
	A2A11C18	O
	A2A11C19,20	T
	A2A11CR20,21	T
6-34	A2A11R45-47	T
	A2A11U8,U34	T
6-35	A2A12	AW,AP
	A2MP8-12	AP
	A2DS5	AX
6-36	A2DS6-8	AX
6-37	A3A1A1C4	L
6-39	A3A1A1VR2	G
	A3A1A2C8	V
6-40	A3A1A2L4	V
6-41	A3A1A2Y1	G
6-42	A3A1A3	AF
6-44	A3A1A4A2R4	H
	A3A1A5C3,6	E
	A3A1A5C38,39	E
	A3A1A5L2	AX
	A3A1A5L3	E
6-45	A3A1A5L12	E
	A3A1A5Q5	AJ,AA,M
	A3A1A5Q6	M
	A3A1A5Q7	O
	A3A1A5Q8,9	M
	A3A1A5R4,36	E
	A3A1A5R40,41	E
	A3A1A5R42	AA
	A3A1 Ground Strap	AV
6-47	A3A3	AS
	A3A3C15	G
	A3A3F1	AS
6-48	A3A3R59	AX
	A3A3R60	AS
	A3A4	AF
	A3A4C12	K,G
6-49	A3A4C16	AF
	A3A4R1,23	AS
6-50	A3A4R46	AF
	A3A5R13,16	V
6-51	A3A5R52	V
	A3A5VR1	V
6-53	A3A7C19	N,A
	A3A7C20	N
	A3A7C23	P
6-54	A3A7Q3	Y
	A3A7R42,43,	D,A
	A3A7R47,52	P,O
	A3A7R55	D,A
	A3A7R61	N,A
	A3A7R65	N,D,A
	A3A7R67	N,A
	A3A7R68	N
	A3A7R71	D
	A3A7R73	P,O
	A3A7R75	N,A
	A3A7R77,R78	P,O
	A3A8	AQ,AG,O
	A3A8MP1,2	AQ,AG
6-56	A3A9J1-6	V
	A3A9W1-3	Z
	A3A9 YTO Deck (Misc.)	Z,R
	A3A9A1	Z
6-57	A3A9A4CR10	C
	A3A9A4R37,38	C
6-58	A3A9A4R54, R55,57	C
	A3A9A5C10	AX
	A3A9A5E1	B
6-59	A3A9A5Q4	F
	A3A9A5R41	B

Table 7-2. Summary of Manual Changes by Page Number (2 of 2)

Page	Description	Changes
6-61	A3C4	K
	A3J6	AX
	A3W18	AK
6-64	A3 Divider	
	Center 21"	R
	HP-IB	
	Adapter	AK
8-37	A3A3A1	
	Tune Voltage	G
8-43	A1A5L4	AE
	A1A5R12,13,	
	R15,16	AI
	A1A5Q1	AE
	A1A5R31	Q
	A1A5R35	AE
	A1A5R36	Q
	A1A5R68,R69	P
	A1A5R75	AE
	A1A14	AW,AL
8-44	Figure 8-28	AK
8-45	A1A3A1R1,2,	
	R10,11	AK
	A1A12	AK
	A1A14	AW,AL
	A1A14Q1,(GU)	S
	A1W14	AK
8-47	A1A14	AW,AL
8-48	Figure 8-35	AD,S
	A1A14	AW,AL
	A1A6C27-30	S
	A1A6R58-74	S
	A1A6R69	AH,S
	A1A6R75	AD
	A1A6TP7	S
	A1A6U9-11	S
	A1A6VR2-4	S
	Schematic	S
8-51	A1A14	AW,AL
8-52	Figure 8-41	AW
8-53	A1A11U8	AI
	Schematic	AW
	A1A14	AW,AL
8-55	A1A14	AW,AL
8-57	A1A1C3	Y
	A1A9R59	AO
	A1A14	AW,AL
8-61	A2A4R23	X
	A2A4R32	AN
8-63	A2A3R34	J
	A2A3C12	J
8-65	A3W18	AK
8-66	U5 pin 6	AW
8-70	Figure 8-69	AW
8-71	Schematic	AW
	A2A10	AT
	A2A10U24	U
	A2A10U25	AT
8-72	Figure 8-72	T
8-73	A2A11U8	T
8-74	Figure 8-75	T
	A2A11C18	O
	A2A11C19,20	T
	A2A11CR20,21	T
	A2A11R45-47	T
	A2A11U8,U34	T
	Schematic	T
8-77	A2A8	AT
	A2A8C7	AX
	A2A8U23	AT
8-79	A2A8	AT
	A2A8U12-14,	
	U22	AT
8-80	Figure 8-84	AR
8-81	A2A1C1	J
	A2A1C2	AB
8-82	Figure 8-87	AR
8-83	A2A1DS1	AR
	A2A1R25	AG
	U3 pins 6,10	AW
	A2A1U3	AW
8-85	A3A1A1C4	L
	A3A1A1R51	G
	A3A1A1VR2	G
	A3A8	AQ,AG
	Tune Voltage	G
8-87	A3A1A2C8,L4	V
	Tune Voltage	G
8-89	A3A1A3	AF
	A3A1A3U1	AF
8-91	A3A1A4A2R4	H
8-93	A3A1A5C3,C6	E
	A3A1A5C38	E
	A3A1A5C39	E
	A3A1A5L2	AX
	A3A1A5L3,12	E
	A3A1A5Q5	AJ,AA,M
	A3A1A5Q6,8,9	M
	A3A1A5R4,36	E
	A3A1A5R40,41	E
	A3A1A5R42	AA
8-95	A3A5R13,16	V
	A3A5R52	V
	A3A5VR1	V
8-99	A3A9A5C10	AX
8-99	A3A9A5E1	B
	A3A9A5Q4	F
	A3A9A5R41	B
8-101	A3A9A4CR10,	
	R37,38	C
	A3A9A4R54,	
	R55,57	C
8-103	A3A7C19	A,N
	A3A7C20	N
	A3A7Q3	Y
	A3A7R42,43	D,A
	A3A7R47,52	P,O
	A3A7R55	D,A
	A3A7R61	N,A
	A3A7R65	N,D,A
	A3A7R67	N,A
	A3A7R68	N
	A3A7R71	D
	A3A7R73	P,O
	A3A7R75	N,A
	A3A7R77,78	P,O
	A3A7R78	P,O
	A3A9A1	Z
8-105	A3C4	K
8-106	Figure 8-123	AS
8-107	A3A3	AS
	A3A3C15	G
	A3A3R59	AX
	A3A3R60	AS
8-109	A3A4	AE
	A3A4C16	AE
	A3A4C12	K,G
	A3A4R1,23	AS
	A3A4R48	AF
8-111	COIL TUNE	S
	RF PWR CONT.	S

CHANGE A

Table 6-3:
Change A3A7C19 to 0160-0134, CAPACITOR-FXD 220 pF ±5% 300 WVDC MICA.
Change A3A7R42 and R43 to 0698-3155, RESISTOR 4.64K 1% .125W F TC=0±100.
Change A3A7R55 to 0757-0416, RESISTOR 511 1% .125W F TC=0±100.
Change A3A7R61* and R75 to 0698-0083, RESISTOR 1.96K 1% .125W F TC=0±100.
Change A3A7R65 to 0757-0439, RESISTOR 6.81K 1% .125W F TC=0±100.
Change A3A7R67 to 0757-0398, RESISTOR 75 1% .125W F TC=0±100.

Service Sheet 10-A3:
Change the following:
A3A7C19 to 220 pF.
A3A7R65 to 6810 ohms.
A3A7R67 to 75 ohms.
A3A7R42 to 4640 ohms.
A3A7R43 to 4640 ohms.
A3A7R55 to 511 ohms.
A3A7R61 to 1960 ohms.
A3A7R75 to 1960 ohms.

CHANGE B

Table 6-3:
Delete A3A9A5R41
Add A3A9A5E1.

Service Sheet 8-A3:
Add A3A9A5E1 in place of A3A9A5R41 (21.5 ohms).

CHANGE C

Table 6-3:
Add A3A9A4CR10, 1901-0535, Diode-Schottky.
Delete A3A9A4R57.
Change the following A3A9A4 Components:
R37 and R38, 0698-0083 RESISTOR 1.96K 1% .125W F TC=0±100.
R54, 0698-7249, RESISTOR 3.48K 1% .05W F TC=0±100.
R55, 0698-7241, RESISTOR 1.62K 1% .05W F TC=0±100.

Service Sheet 9-A3:
The following changes are to be made to the A3A9A4 assembly:
Delete R57.
Change R37 and R38 to 1.96K ohms.
Change R54 to 3480 ohms.
Change R55 to 1628 ohms.
Add CR10, connected between U7 pin 12 and ground.

CHANGE D

Table 6-3:
Change the following A3A7 resistors as follows:
R42, 0698-3151, RESISTOR 4.64K 1% .125W F TC=0±100.
R43, 0757-0279, RESISTOR 3.16K 1% .125W F TC=0±100.
R55, 0698-3445, RESISTOR 348Ω 1% .125W F TC=0±100.
R65*, 0698-3151, RESISTOR 4.64K 1% .125W F TC=0±100.
R71, 0686-1825, RESISTOR, 1.8K 5% .5W CC TC=0+647.

Service Sheet 10-A3:
Change the following A3A7 resistors:
R42 to 4640 ohms.
R43 to 3160 ohms.
R55 to 511 ohms.
R65* to 6810 ohms.
R71 to 1800 ohms.

CHANGE E

Table 6-3:
Change A3A1A5C3 to 0160-2251, CAPACITOR-FXD 5.6 pF ±0.25 pF 500 WVDC CER.
Add A3A1A5C6, 0160-3878, CAPACITOR-FXD 1000 pF ±20% 100 WVDC CER.
Delete A3A1A5R40.
Delete A3A1A5R41.
Change A3A1A5R4, 0698-7212, RESISTOR 100 1% 0.05W F TC=0±100.
Change A3A1A5R36, 0698-7222, RESISTOR 261 1% 0.05W F TC=0±100.
Add A3A1A5C38, 0160-2238, CAPACITOR-FXD 1.5 pF ±0.25 pF 500 WVDC CER.
Add A3A1A5C39, 0160-2260, CAPACITOR-FXD 13 pF ±5% 500 WVDC CER.
Add A3A1A5L3 and L12, 9100-0346, COIL-FXD MOLDED RF CHOKE 0.05 μH 20%

Service Sheet 5-A3:
Change A3A1A5R36 to 82.5 ohms.
Add A3A1A5C38.
Change A3A1A5R40 to A3A1A5L12 0.05 μH.
Change A3A1A5R41 to A3A1A5C39, 13 pF.
Change A3A1A5R4 to 100 ohms.
Change A3A1A5C3 to 5.6 pF.
Add A3A1A5L3, 50 nH, connected from the collector of Q5 to ground.
Add A3A1A5C6; 1000 pF, connected from the collector of Q5 to the LO input of U1.

CHANGE F

Table 6-3:
Change A3A9A5Q4 to 1855-0218, TRANSISTOR-MOSFET DUAL-GATE N-CHAN E-MODE.

Service Sheet 8-A3:
Change the part number of A3A9A5Q4 to 1855-0218.

CHANGE G

Paragraph 5-24:
Change step 2 to "Connect −10 Vdc from a low voltage power supply to the TUNE test point A3A1A2TP1.

CHANGE G (Cont'd)

Table 6-3:
Change A3A1A1R51 to 0698-3136, RESISTOR 17.8K 1% 0.125W F TC=0±100.
Change A3A1A1R75 to 0698-7247, RESISTOR 2.87K 1% 0.05W F TC=0±100.
Change A3A1A1VR2 to 1902-0184, DIODE-ZNR 16.2V 5% DO—7 PD=0.4W TC=+0.066%.
Change A3A1A2Y1 to 0410-0482.
Delete A3A3C15.
Change A3A4C12 to 0160-3460, CAPACITOR-FXD 0.05 μF +80% 100 WVDC CER.

Service Sheet 2 text (troubleshooting):
Change the last sentence of the first paragraph to "This is normally —10 Vdc when the loop is locked."

Service Sheet 2:
Change the A3A1A1 TUNE VOLTAGE to "—5 to —40 Vdc, —10 Vdc nominal."

Service Sheet 1-A3:
Change the TUNE VOLTAGE to "—10 Vdc nominal."
Change the value of A3A1A1R51 to 17.8K and A3A1A1R75 to 2870 ohms.
Change the rated value of A3A1A1VR2 to 16.2V.

Service Sheet 2-A3:
Change the TUNE VOLTAGE to "—5 to —40 Vdc, —10 Vdc nominal."

Service Sheet 12-A3:
Delete A3A3C15.

Service Sheet 13-A3:
Change the value of A3A4C12 to 0.05 μF.

CHANGE H

Table 6-3:
Change A3A1A4A2R4 to 0698-3150, RESISTOR 2.37K 1% 0.125W F TC=0±100.

Service Sheet 4-A3:
Change the value of A3A1A4A2R4 to 2370 ohms.

CHANGE I

Table 1-1:
Change the FREQUENCY MODULATION CHARACTERISTICS, Frequency Response (relative to 100 kHz rate) to
"±1.5 dB, 100 Hz —3 MHz, 30 and 100 kHz/V ranges;
±1.5 dB, 3 kHz —3 MHz, 300 kHz/V and 1, 3, 10 MHz/V ranges."

Table 4-4:
Change the specification for FM FREQUENCY RESPONSE to "±1.5 dB from 100 Hz to 3 MHz."

CHANGE J

Table 6-3:
Change A2A1C1 to 0180-0197, CAPACITOR-FXD 2.2 UF ±10% 20 VDC TA.
Delete A2A3R34.
Change A2A3C12 to 0160-2200, CAPACITOR-FXD 43 pF ±5% 300 WVDC MICA.

CHANGE J (Cont'd)

Service Sheet 3-A2:
Delete A2A3R34.
Change A2A3C12 to 43 pF.

Service Sheet 12-A2:
Change A2A1C1 to 2.2 μF.

CHANGE K

Table 6-3:
Change A3A4C12 to 0160-3460 CAPACITOR-FXD 0.05 UF +80 —20% 100 WVDC CER.
Change A3C4 to 0180-0455 CAPACITOR-FXD 0.0425F +100 —10% 15 WVDC AL.

Service Sheet 11-A3:
Change A3C4 to 42500 μF.

Service Sheet 13-A3:
Change A3A4C12 to 0.05 μF.

CHANGE L

Table 6-3:
Delete A3A1A1C4.

Service Sheet 1-A3:
Delete A3A1A1C4 (0.01 μF).

CHANGE M

Table 6-3:
Change A3A1A5Q5, Q6, Q8, and Q9 to 1854-0345 TRANSISTOR NPN 2N5179 SI TO-72 PD 200 MW.

Service Sheet 5-A3:
Change the part number for A3A1A5Q5, Q6, Q8 and Q9 to 1854-0345.

CHANGE N

Table 6-3:
Change the following:

A3A7C19*	to 0160-2206 CAPACITOR-FXD 160 PF ±5% 300VDC MICA
A3A7C20	to 0140-0210 CAPACITOR-FXD 270 PF ±5% 300VDC MICA
A3A7R61*	to 0698-6113 RESISTOR 1.82K .25% .125W F TC=0±100
A3A7R65*	to 0757-0200 RESISTOR 5.62K 1% .125W F TC=0±100
A3A7R67*	to 0698-3439 RESISTOR 178 1% .125W F TC=0±100
A3A7R68	to 0757-0424 RESISTOR 1.1K 1% .125W F TC=0±100
A3A7R75*	to 0698-4429 RESISTOR 1.87K 1% .125W F TC=0±100

CHANGE N (Cont'd)

Service Sheet 10-A3:
Change the following in A3A7:
C19* to 160 pF.
C20 to 270 pF.
R61* to 1820 ohms.
R65* to 5620 ohms.
R67* to 178 ohms.
R68 to 1100 ohms.
R75* to 1870 ohms.

CHANGE O

Table 6-3:
Change A3A8 to 86701-60074 old part number not available.
Delete A3A7R47 750 ohms.
Change A3A7R52 and R77 to 0698-3155 RESISTOR 4.64K 1% .125W F TC=0±100.
Change A3A7R73 to 0698-3435 RESISTOR 38.3 1% .125W F TC=0±100.
Change A3A7R78 to 0757-0316 RESISTOR 42.2 1% .125W F TC=0±100.
Change A2A11C18 to 0160-3878 CAPACITOR-FXD 1000 PF ±20% 100VDC CER.
Change A3A1A5Q7 to 1854-0345 TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW.

Service Sheet 9-A2:
Change A2A11C18 to 1000 pF.

Service Sheet 10-A3:
Delete A3A7R47 750 ohms.
Change A3A7R52 and R77 to 4640 ohms and show them connected in parallel.
Change A3A7R73 to 38.3 ohms and R78 to 42.2 ohms and show them connected in series.

CHANGE P

Table 6-3:
Change the following:
A1A5R68 to 0698-0083 RESISTOR 1.96K 1% .125W F TC=0±100.
A1A5R69 to 2100-3350 RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN.
A3A7C23 to 0180-1719 CAPACITOR-FXD 22 UF ±10% 25VDC TA.
A3A7R47 to 0757-0420 RESISTOR 750 1% .125W F TC=0±100.
A3A7R52 to 0757-0429 RESISTOR 750 1% .125W F TC=0±100.
A3A7R73 to 0757-0802 RESISTOR 162 1% .5W F TC=0±100.
A3A7R77 to 0757-0420 RESISTOR 750 1% .125W F TC=0±100.
A3A7R78 to 0757-0802 RESISTOR 162 1% .5W F TC=0±100.

Service Sheet 1-A1:
Change A1A5R68 to 1780 ohms.
Change A1A5R69 to 500 ohms.

Service Sheet 10-A3:
Change A3A7R52 and R77 to 750 ohms and show them connected in series.
Add A3A7R47 750 ohms and show it connected in series between −40V(F) and R77.
Change A3A7R73 and R78 to 162 ohms and show them connected in parallel.

CHANGE Q

Table 6-3:
Change the following:
A1A5R31 to 0698-3401 RESISTOR 215 1% .5W F TC=0±100.
A1A5R36 to 0757-0401 RESISTOR 100 1% .125W F TC=0±100.

Service Sheet 1-A1:
Change A1A5R31 to 215 ohms.
Change A1A5R36 to 100 ohms.

CHANGE R

Table 6-3:
Under A3A9 MISCELLANEOUS:
Change YTO DECK to 86701-00009.
Under A3 MISCELLANEOUS:
Change DIVIDER CENTER 21" to 86701-00020.

CHANGE S

Table 1-1:
Delete from FREQUENCY CHARACTERISTICS under Switching Time (CW and AM modes):
<15ms to be within 3 dB of final amplitude level for any frequency change on the same band.

Table 6-3:
Change A1A6 Assembly to 08672-60045.

Service Sheet 2-A1:
Delete offpage connector GU from collector of A1A14Q1.

Figure 8-35:
Replace with Figure 7-1.

Service Sheet 4-A1:
Delete the following:

C27 0.10 μF	R63 7500 ohms	R74 10 ohms
C28 0.01 μF	R64, R65, R70 1000 ohms	TP7
C29 0.022 μF	R66 422 ohms	U9 1820-0125
C30 1.0 μF	R67 215 ohms	U10 1820-1422
Q10 1855-0049	R68 147 ohms	U11 1820-1144
R58 4640 ohms	R69 6190 ohms	VR2 12.1V
R59, R73 56.2 kohms	R71 1210 ohms	VR3 6.19V
R60, R61 909 ohms	R72 100 kohms	VR4 3.48V
R62 19.6 kohms		

Change the lower portion of the schematic as shown in Figure 7-2.

Service Sheet 6-A1:
Change offpage connector HR to 7-A1.

Table 8-6:
Delete pin 8 in column A6 next to Coupler Drive to YTM.
Delete pin 7 in column A6 next to RF PWR CONT.

CHANGE S (Cont'd)

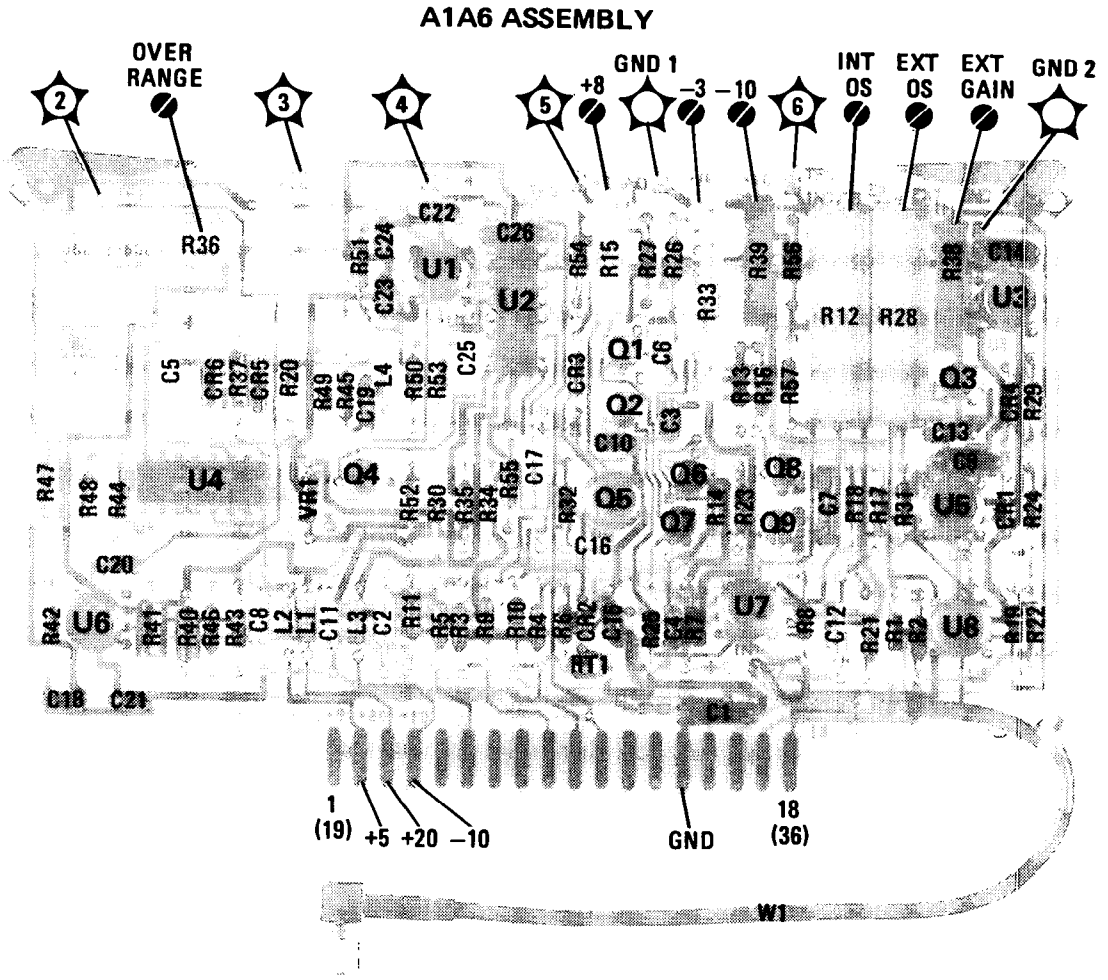


Figure 7-1. A1A6 ALC Detector Assembly Component, Adjustment, and Test Point Locations (P/O Change S).

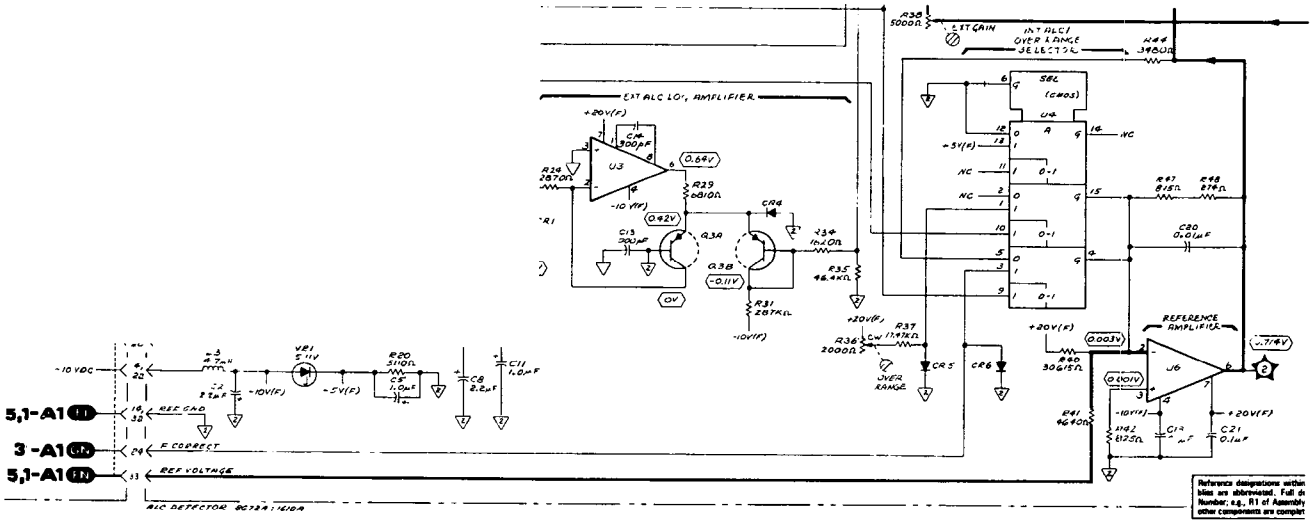


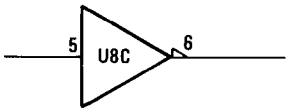
Figure 7-2. P/O ALC Loop Schematic (P/O Change S).

CHANGE T

Table 6-3:
Change the following on A2A11:
C19 to 0160-2208 CAPACITOR-FXD 330 PF ±5% 300VDC MICA.
C20 to 0160-3877 CAPACITOR-FXD 100 PF ±20% 200VDC CER
R45 to 0698-3150 RESISTOR 2.37K 1% .125W F TC=0±100.
R46 to 0757-0280 RESISTOR 1K 1% .125W F TC=0±100.
U8 to 1820-1199 IC INV TTL LS HEX.
Add the following:
CR20 1901-0518 DIODE SCHOTTKY.
CR21 1901-0518 DIODE SCHOTTKY.
R47 0757-0280 RESISTOR 1K 1% .125W F TC=0±100.
Delete U34 1820-1423.

Figure 8-72:
Replace with Figure 7-3.

Service Sheet 8-A2:
Change the symbol for A2A11U8B as follows:



Change U8 to 1820-1199.

Figure 8-75:
Replace with Figure 7-4.

Service Sheet 9-A2:
Change U8 to 1820-1199.
Change upper portion of schematic with partial schematic from Figure 7-5.
Change the following A2A11 components:
C19 330 pF.
C20 to 100 pF.
R45 to 2370 ohms.
R46 to 1000 ohms.
Add the following components to A2A11 and make the required changes in the REFERENCE DESIGNATIONS box.
R47 1000 ohms.
CR20 and CR21.
Delete A2A11U34 1820-1423.

CHANGE T (Cont'd)

P/O A2A11 ASSEMBLY

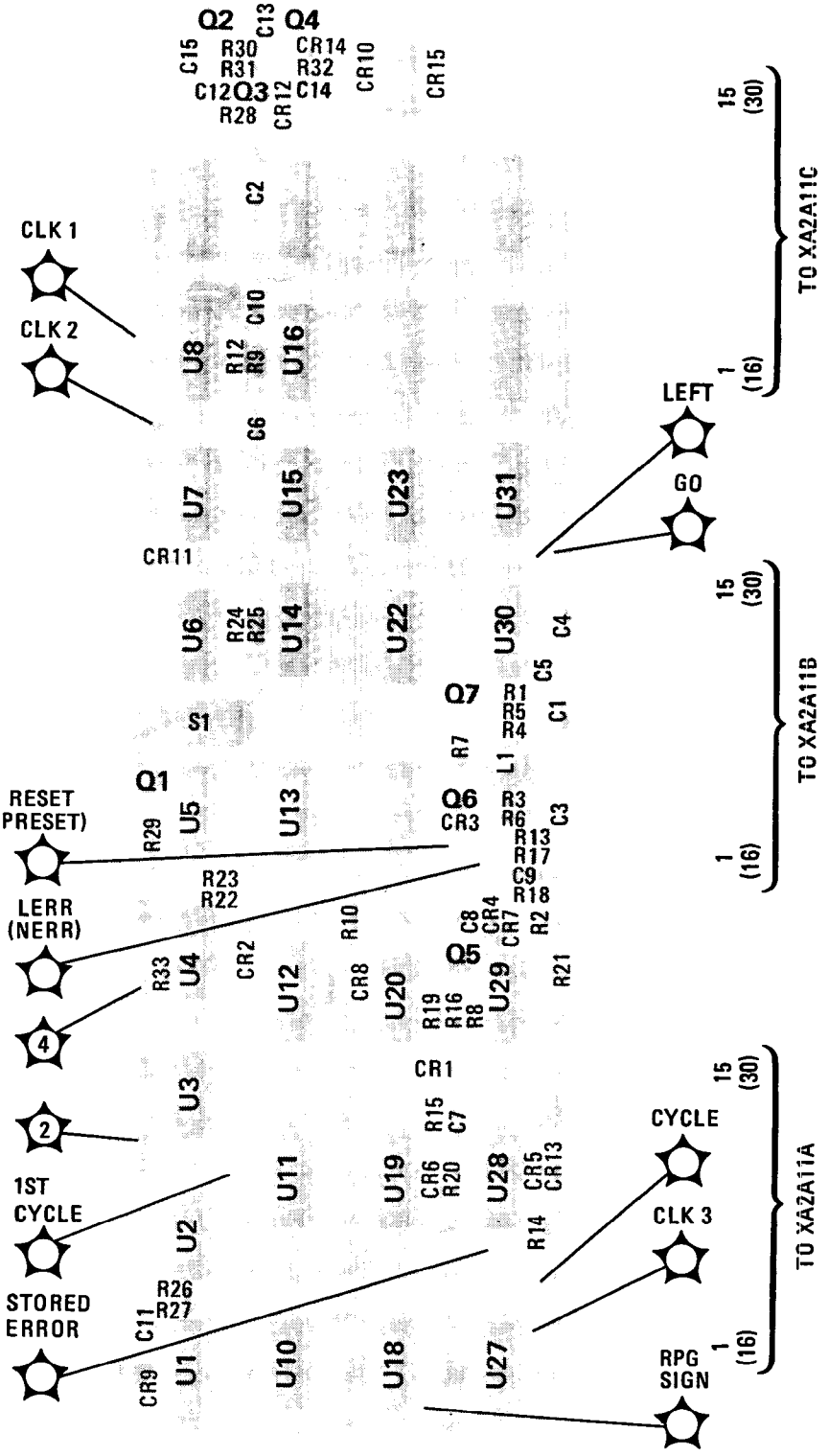


Figure 7-3. P/O A2A11 Timing and Control Assembly Component, Adjustment, and Test Point Locations (P/O Change T).

CHANGE T (Cont'd)

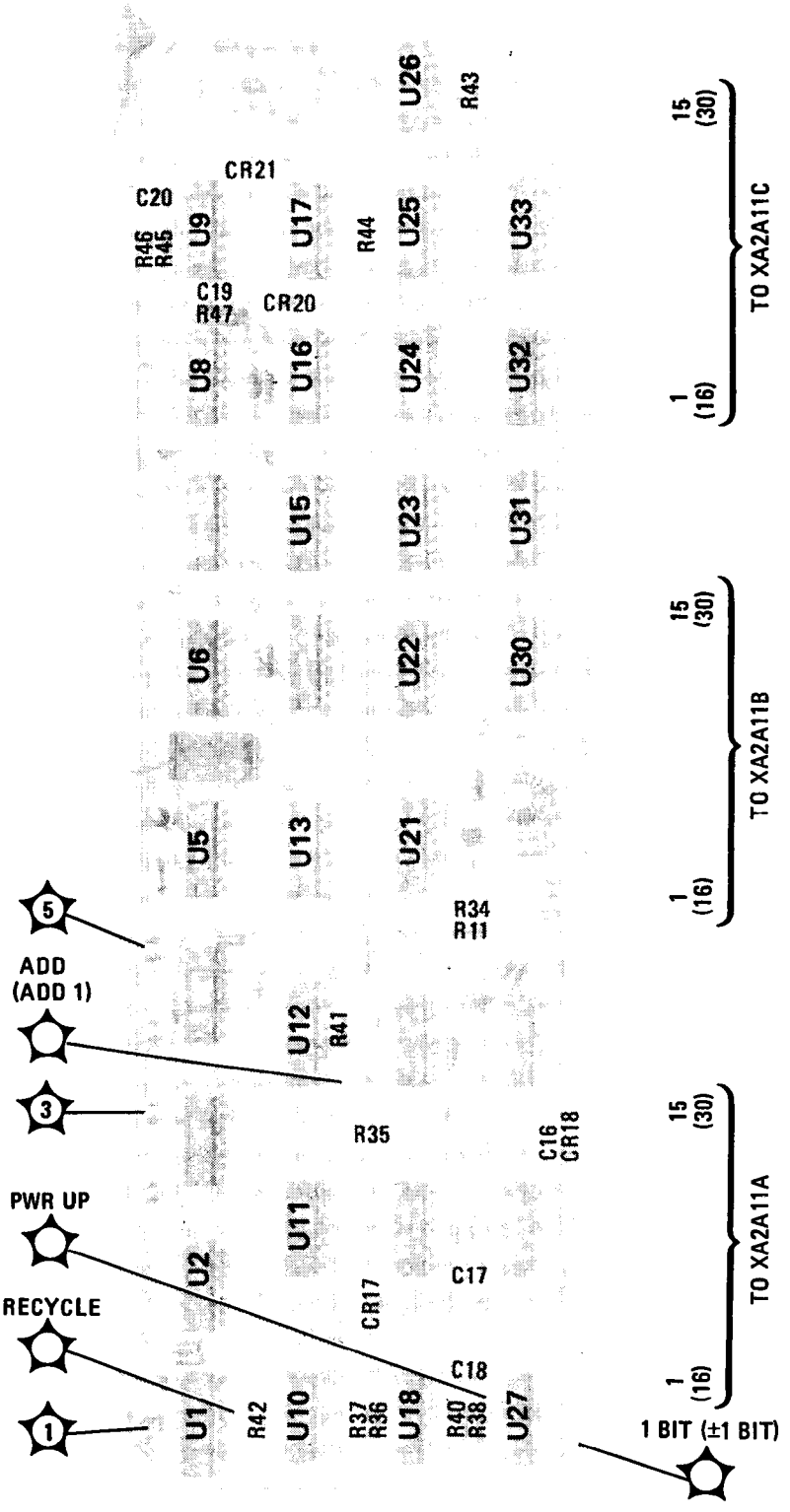


Figure 7-4. P/O A2A11 Timing and Control Assembly Component and Test Point Locations (P/O Change T).

CHANGE T (Cont'd)

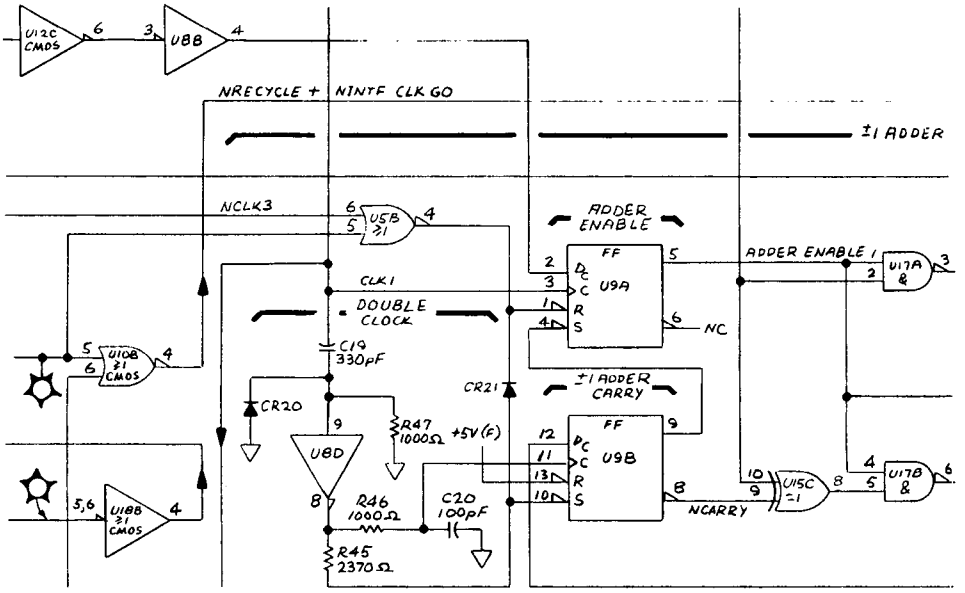


Figure 7-5. P/O Timing and Control Assembly Schematic Diagram (P/O Change T).

CHANGE U

Table 6-3:
Change A2A10U24 to 1820-1745 IC GATE CMOS NOR QUAD 2-INP.

Service Sheet 7-A2:
Change A2A10U24 to 1820-1745.

CHANGE V

Table 6-3:
Change the following:
A3A1A2C8 to 0160-2256 CAPACITOR-FXD 9.1 PF ±.25 PF 500VDC CER.
A3A1A2L4 to 9100-2252 COIL-MLD 270 NH 10% Q=30.
A3A5R13 to 2100-1662 RESISTOR-TRMR 50K 5% WW SIDE-ADJ 22-TRN.
A3A5R16 to 0698-7879 RESISTOR 14.3K 1% .125W F TC=0±25.
A3A5R52 to 0698-6358 RESISTOR 100K .1% .125W F TC=0±25.
A3A5VR1 to 1902-0625 DIODE-ZNR 1N829 6.2V 5% D0-7.
A3A9J1 through J6 to 1250-0901.

Service Sheet 2-A3:
Change the following:
A3A1A2C8 to 9.1 pF.
A3A1A2L4 to 270 nH.

Service Sheet 6-A3:
Change the following:
A3A5R13 to 50 kohms.
A3A5R16 to 14.3 kohms.
A3A5R52 to 100 kohms.
A3A5VR1 to 6.2V.

CHANGE W

Table 1-1:
Under SPECTRAL PURITY CHARACTERISTICS Single-Sideband Phase Noise (1 Hz BW, CW mode), replace table with the following table:

Frequency Range (GHz)	SSB Phase Noise Ratio (in 1 Hz BW, CW mode) at Specified Offset Frequency*				
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz
2.0—6.2	—60dB	—70dB	—78dB	—86dB	—110dB
6.2—12.4	—54dB	—64dB	—72dB	—80dB	—104dB
12.4—18.0	—50dB	—60dB	—68dB	—76dB	—100dB

Page 4-22, paragraph 4-20:
Replace SPECIFICATION table with the table below:

Frequency Range (GHz)	Single Sideband Phase Noise Ratio (in 1 Hz Bandwidth and CW Mode) at Specified Offset Frequency				
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz
2.0—6.2	—60 dBc	—68 dBc	—78 dBc	—89 dBc	—109 dBc
6.2—12.4	—54 dBc	—62 dBc	—72 dBc	—83 dBc	—103 dBc
12.4—18.0	—50 dBc	—58 dBc	—68 dBc	—79 dBc	— 99 dBc

Page 4-23, NOTE:
Change the NOTE to read as follows:

NOTE

The signal-to-phase noise ratio as measured with the spectrum analyzer is reduced by the 2.4 dB noise correction factor. This correction is necessary due to the spectrum analyzer characteristics.

Page 4-23, PROCEDURE:
Change step 6 specification to 60 and measured level to 57.6.
Change step 8 specification to 54 and measured level to 51.6.

Page 4-24, PROCEDURE (cont'd):
Change step 10 specification to 50 and measured level to 47.6.
Change step 12 measured level to:

60.8 dB down_____

54.8 dB down_____

50.8 dB down_____

Change step 16 specification to 75 and measured level to 60.8.
Change step 17 specification to 69 and measured level to 54.8.
Change step 18 specification to 65 and measured level to 50.8.

CHANGE W (Cont'd)

Page 4-24, PROCEDURE (cont'd):
Change step 20 measured level to:

61.8 dB_____
55.8 dB_____
51.8 dB_____

Page 4-25. PROCEDURE (cont'd):
Change step 22 measured level to:

71.8 dB_____
65.8 dB_____
61.8 dB_____

Table 4-4, (Paragraph 4-20):
Change the following:

2.0—6.2 GHz	10 Hz	—60 dBc	_____	57.6 dB down
6.2	100 Hz	—68 dBc	_____	60.8 dB down
	1 kHz	—78 dBc	_____	60.8 dB down
	10 kHz	—89 dBc	_____	61.8 dB down
	100 kHz	—109 dBc	_____	71.8 dB down
6.2—12.4 GHz	10 Hz	—54 dBc	_____	51.6 dB down
	100 Hz	—62 dBc	_____	54.8 dB down
	1 kHz	—72 dBc	_____	54.8 dB down
	10 kHz	—83 dBc	_____	55.8 dB down
	100 kHz	—103 dBc	_____	65.8 dB down
12.4—18.0 GHz	10 Hz	—50 dBc	_____	47.6 dB down
	100 Hz	—58 dBc	_____	50.8 dB down
	1 kHz	—68 dBc	_____	50.8 dB down
	10 kHz	—79 dBc	_____	51.8 dB down
	100 kHz	—99 dBc	_____	61.8 dB down

CHANGE X

Table 6-3:
Change A2A4R23 to 0757-0817 RESISTOR 750 1% .5W F TC=0±100.

Service Sheet 2-A2:
Change A2A4R23 to 750 ohms.

CHANGE Y

Table 6-3:
Delete A1A1C3 0160-0174 CAPACITOR-FXD 0.47 UF.
Change A3A7Q3 to 1854-0238 TRANSISTOR NPN 2N3933 SI T0-72 PD=200MW.

Service Sheet 8-A1:
Delete A1A1C3 0.47 μF.

CHANGE Y (Cont'd)

Service Sheet 10-A3:
Change A3A7Q3 to 1854-0238.

CHANGE Z

Table 6-3:
Change the following:
A3A9W1 to 86701-20032.
A3A9W2 to 86701-20031.
A3A9W3 to 86701-20062.
Under A3A9 MISCELLANEOUS:
YTO DECK to 86701-00056.
A3A9A1 to 5086-7237.

Service Sheet 10-A3:
Change A3A9A1 Directional Coupler to 5086-7237.

Figure 8-139:
Replace with Figure 7-6.

A3A9 ASSEMBLY

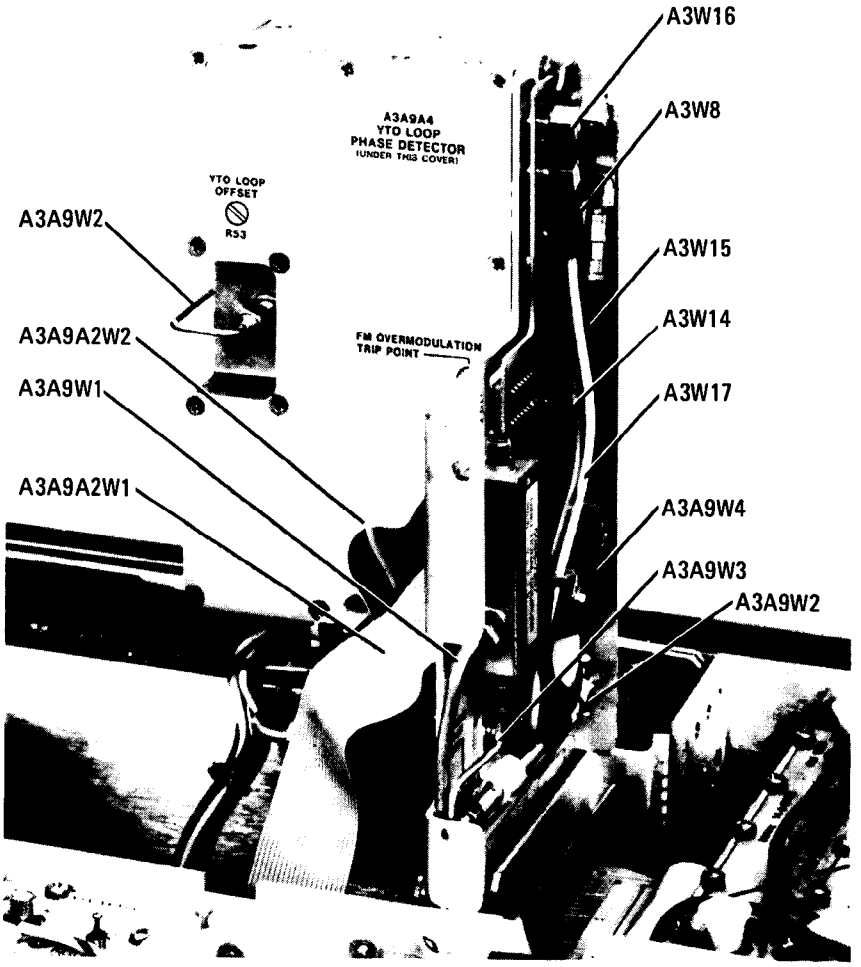


Figure 7-6. Cable Connections (P/O Change Z)

CHANGE AA

Table 6-3:

Change A3A1A5Q5 to 1854-0546.

Delete A3A1A5R42 0698-7205 51.1 ohms.

Service Sheet 5-A3:

Delete A3A1A5R42 from A3A1A5Q5 collector to ground.

Change A3A1A5Q5 to 1854-0546.

CHANGE AB

Table 6-3:

Change A2A1C2 to 0160-3878 CAPACITOR-FXD 1000 PF ±20% 100VDC CER.

Service Sheet 12-A2:

Change A2A1C2 to 1000 pF.

CHANGE AC

Table 6-3:

Change A1A5CR6 to 1901-0518.

CHANGE AD

Table 6-3:

Change A1A6 to 08672-60121.

Delete A1A6R75 51.1 kΩ.

Figure 8-35:

Replace with Figure 7-7.

A1A6 ASSEMBLY

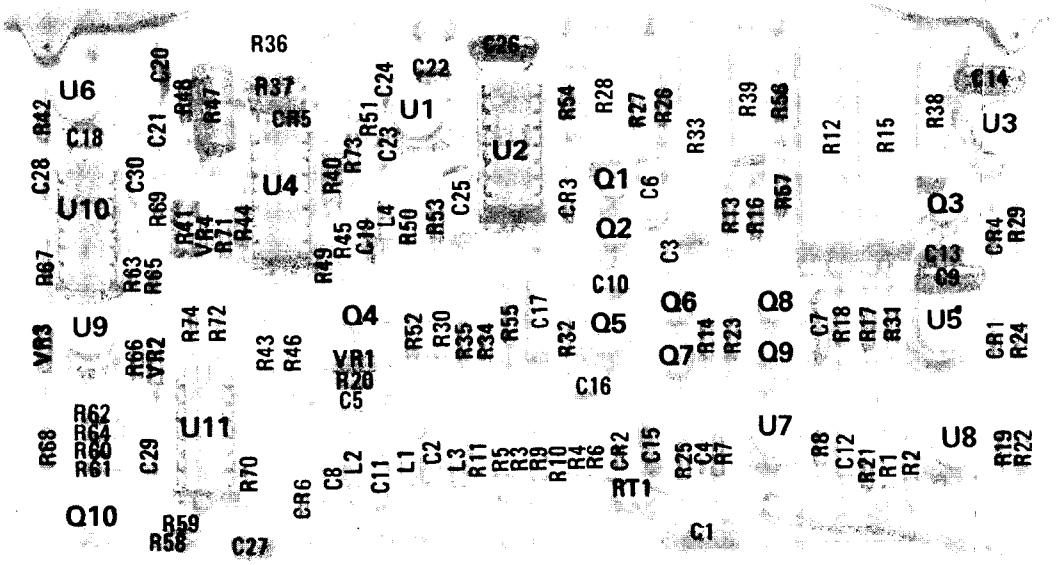


Figure 7-7. A1A6 ALC Detector Assembly Component, Adjustment, and Test Point Locations (P/O Change AD)

CHANGE AD (Cont'd)

Service Sheet 4-A1:
Delete A1A6R75 51.1 kohms and offpage connector AA.

CHANGE AE

Table 6-3:
Delete A1A5L4 9100-1623 27 UH.
Delete A1A5R75 0757-0421 825 ohms.
Add A1A5Q1 1853-0020 TRANSISTOR PNP SI PD=300MW FT=150MHZ.
Add A1A5R35 0698-3155 RESISTOR 4.64K 1% .5W F TC=0±100.

Service Sheet 1-A1:
Add A1A5Q1 and A1A5R35 as follows:
Connect the base of Q1 to the emitter of Q2; connect the emitter of Q1 to R35; connect the free end of R35 to the emitter of Q5; connect the collector of Q1 to pin 11 of the edge connector and label this new line SRD MOD.
Remove A1A5L4 27 μH and insert a jumper.
Remove A1A5R75 825 ohms from the emitter of Q14 and insert a jumper.

CHANGE AF

Table 6-3:
Change A3A1A3 to 86701-60019.
Change A3A4 to 86701-60014.
Delete A3A4C16 0180-0100 4.7 UF CAPACITOR.
Delete A3A4R48 0757-0401 RESISTOR 100 ohms.

Service Sheet 3-A3:
Change A3A1A3 to 86701-60019.
Change the output connections on A3A1A3U1 as follows:
1) Break connection at U1 pin 3 and connect to U1 pin 11.
2) Show U1 pin 3 as NC (no connection).
3) Break connection at U1 pin 12 and connect to U1 pin 4.
4) Show U1 pin 12 as NC (no connection).

Service Sheet 13-A3:
Change A3A4 to 86701-60014.
Delete A3A4C16 4.7 μF from A3A4U1 pin 7 to ground and from the Reference Designation box.
Delete A3A4R48 100 ohm from A3A4U1 pin 7 and connect pin 7 to ground 2 and delete from the Reference Designation box.

CHANGE AG

Table 6-3:
Change A2A1R25 0698-7261 RESISTOR 11K 1% .05W F TC=0±100.
A3A8: The original part was 86701-60074. The part already listed in Table 6-3 is the recommended replacement for all instruments. Therefore, no manual change is recommended.
Change A3A8MP1 to 86701-00043. This bracket also fits 86701-60083.

CHANGE AG (Cont'd)

Table 6-3 (cont'):
Delete A3A8MP2 1400-0510 CD3 CLAMP-CABLE .15-DIA .62-WD NYL (FOR 86701-60079 ONLY).

Service Sheet 13-A2:
Change A2A1R25 to 11 kohms.

Service Sheet 1-A3:
Change A3A8 10 MHz Reference Oscillator Assy to 86701-60074: (Except Option 002).

CHANGE AH

Table 6-3:
Change A1A6R69 to 0698-7255 RESISTOR 6.19K 1% .05W F TC=0±100.

Service Sheet 4-A1:
Change A1A6R69 to 6190 ohms.

CHANGE AI

Table 6-3:
Change the following:
A1A5R12, R13, R15, R16 0757-0442 RESISTOR 10K 1% .125W F TC=0±100.
A1A11U8 08672-80016.

Service Sheet 1-A1:
Change A1A5R12, R13, R15, R16 to 10 kohms.

Service Sheet 6-A1:
Change A1A11U8 to 08672-80016.
Delete U8 pin 23.

CHANGE AJ

Table 6-3:
Change A3A1A5Q5 to 1854-0686 TRANSISTOR NPN SI TO-72 PD=200MW.

Service Sheet 5-A3:
Add A3A1A5Q5 1854-0686.

CHANGE AK

Table 6-3:
Under A1A3A1 make the following changes:
Delete R1 and R11 0698-7245 RESISTOR 2.37K 1%.
Change R2 to 0698-7240 RESISTOR 1.47K 1% .05W F TC=0±100.
Change R10 to 0698-1555 RESISTOR 1.5M 5% .25W F TC=—900+1100.
Add R1 2100-3056 RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN.
Under 8672A CHASSIS/MISCELLANEOUS Parts:
Delete 5060-9462 ADAPTER HP-IB.

CHANGE AK (Cont'd)

Table 6-3:

A3W18: This HP-IB Adapter was not installed on original instruments. However, it can be added, and is needed when using HP-IB cables HP 10833A-D. Therefore, no change in Table 6-3 is recommended. This adapter is not needed when using HPIB cables HP 10631A-D.

Figure 8-28:

Replace with Figure 7-8.

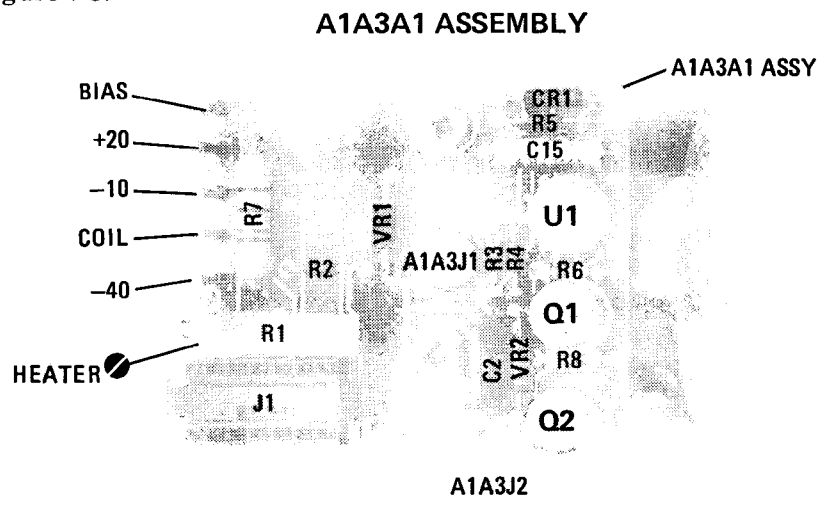


Figure 7-8. A1A3A1 YTM Assembly Component, Adjustment, and Test Point Locations (P/O Change AK).

Service Sheet 2-A1:

Delete A1A3A1R1 and R11 2370Ω.
Change A1A3A1R2 to 1470 Ω.
Change A1A3A1R10 to 1.5 MΩ.
Add A1A3A1R1 5000Ω Trimmer pot.
Connect the wiper of R1 to the junction of R4 and R9. Connect the CW end of R1 to ground and the CCW end to –10V.
Label R1 HEATER.
Delete the connections providing +5 volts to the A1A2 Power Amplifier.

Service Sheet 4-A2:

A3W18: This HP-IB Adapter was not installed on original instruments. However, it can be added, and is needed when using HP-IB cables HP 10833A-D. Therefore, no change in the schematic is recommended. This adapter is not needed when using HPIB cables HP 10631A-D.

CHANGE AL

Table 6-3:

A1A14 was originally 08672-60050. However, the new part listed in Table 6-3 is the recommended replacement. Therefore, no manual change is recommended.

CHANGE AM

Table 6-3:

A1J1, Connector, RF Output, except Options 001, 004, 005, was originally not separately replaceable, part of A1W8. The recommended replacement is the part for A1W8 already listed in Table 6-3, together with the new A1J1, hardware, and Connector Support Bracket listed. Therefore, no manual change is recommended.

CHANGE AM (cont'd)

Table 6-3 (cont'd):

A1J1, Connector, RF Output, Option 001 only, was originally not separately replaceable, part of A1W8. The recommended replacement is the part for A1W8 already listed in Table 6-3, together with the new A1J1 Connector and hardware listed. Therefore, no manual change is recommended.

A1W8 RF Output Cable, including A1J1 (except Options 001, 004, 005) was originally 8120-2459. The new parts for A1W8 and A1J1 listed in Table 6-3, with the hardware and connector listed, are the recommended replacements. Therefore, no manual change is recommended.

A1W8 RF Output Cable, including A1J1 (Option 001 only) was originally 8120-2472. The new parts for A1W8 and A1J1 listed in Table 6-3, with the hardware listed, are the recommended replacements. Therefore, no manual change is recommended.

The Connector Support Bracket, listed under A1 Miscellaneous, was originally 08672-00027. The new part listed in Table 6-3 fits the new A1J1 Connector.

CHANGE AN

Table 6-3:

Delete A2A4R32.

Service Sheet 2-A2 (schematic):

Replace A2A4R32 (near A2A4Q2) with a direct connection.

CHANGE AO

Service Sheet 8-A1 (schematic):

At A1A9R59, change ground 2 to ground A.

CHANGE AP

The components and assemblies listed in Table 6-3 are not interchangeable with the original components and assemblies listed below.

A2A3 08672-60143 VCO Assembly
A2A3MP1 08672-20026 VCO Cover
A2A4 08672-60007 20/30 Phase Detector Assembly
A2A4MP1 08672-20027 Phase Detector Cover
A2A5 08672-60008 20/30 Divider Assembly
A2A5MP1 08672-60028 Divider Cover
A2A12 08672-60015 Mother Board Assembly
A2MP8 7100-0647 Cover Can
A2MP9 08672-20031 Amplifier Housing

Under A2 Miscellaneous:

Delete A2MP10 08672-20120 Step Washer
Delete A2MP11 08672-20146 Mounting Block
Delete A2MP12 08672-20147 Standoff Cover

Change AQ

Table 6-3:

A3A8 was originally 86701-60079. However, the new part already listed in Table 6-3 is the recommended replacement. Therefore, no manual change is recommended. If the new part is ordered, you will need the new Bracket A3A8MP1 also.

A3A8MP1 Bracket was originally 86701-00059. This bracket fits only the 86701-60079 10 MHz Reference Oscillator Assembly.

Add A3A8MP2 Cable Clamp .15 Dia.

Service Sheet 1-A3 (schematic):

Change A3A8 to 86701-60079.

CHANGE AR

Figure 8-87:
Add a 935 wire callout, just below C1 (see Figure 8-84).

Service Sheet 13-A2 (schematic):
Delete the connection between DS1 (STBY) and the 934 solder terminal. Add a solder terminal labeled 935 connected to DS1. Add an external 935 wire connecting the 935 terminal to the 934 wire.

CHANGE AS

Table 6-3:
Change A3A3 to 86701-60013.
Change A3A3F1 to 2110-0056, 6A 250V 1.25X.25.
Delete A3A3R60.
Change A3A4R1 and R23 to 0811-1552, .56 Ohm, 2W.

Figure 8-123:
Delete R60.

Service Sheet 12-A3 (schematic):
Change A3A3 to 86701-60013.
At Q7 collector, delete R60. Connect Q7 collector to Q5 collector.

CHANGE AT

Table 6-3:
Change A2A8 to 08672-60011.
Change A2A8U12, U13, U14, and U22 to 1820-0497, SN74L95N.
Change A2A8U23 to 1820-0656, SN74L98N.
Change A2A10 to 08672-60010.
Change A2A10U25 to 1820-0656, SN74L98N.

Service Sheet 7-A2 (schematic):
Change A2A10 to 08672-60010.
Change U25 pin numbers,

10 to 9	5 to 6
11 to 10	9 to 5
2 to 1	6 to 7
3 to 2	7 to 12
4 to 3	12 to 11
1 to 4	

All others remain the same.
Change U25 to 1820-0656 in the table of transistor and integrated circuit part numbers.

Service Sheet 10-A2 (schematic):
Change A2A8 to 08672-60011.
Change U23 pin numbers,

10 to 9	1 to 4
11 to 10	4 to 3
6 to 7	5 to 6
7 to 12	9 to 5
2 to 1	12 to 11
3 to 2	

All others remain the same.
Change U23 to 1820-0656 in the table of transistor and integrated circuit part numbers.

CHANGE AT (Cont'd)

Service Sheet 11-A2 (schematic):
Change A2A8 to 08672-60011.
Change U12, U13, U14 and U22 pin numbers,
9 to 7
2 to 14
3 to 2
4 to 3
11 to 10
10 to 9
All others remain the same.

Change U12-14, U22 to 1820-0497 in the table of transistor and integrated circuit part numbers.
In the table of Integrated Circuits Voltage and Ground Conections for U12-14, 22, change pin 14 to 4, and pin 7 to 11.

CHANGE AU

Table 6-3: Table 6-3:
Delete Ground Strap, 5001-0176 (under A3A1A5 Miscellaneous).

CHANGE AV

Table 1-1:
Change specificatons for Incidental ϕM to read;
Incidental ϕM (Rates ≤10 kHz, 30% depth):
<0.5 Rad, 2.0 — 6.2 GHz
<1.5 Rad, 6.2 — 12.4 GHz
<1.0 Rad, 12.4 — 18.0 GHz
Change specifications for Residual FM to read:

Mode/Range	Residual FM in Post Detection Bandwidth	
	20 Hz—1 kHz	20 Hz—3 kHz
CW and 30 kHz/V thru 3 MHz/V ranges	6Hz—rms	12 Hz—rms
10 MHz/V range	10 Hz—rms	20 Hz—rms

Page 4-29, paragraph 4-23:
Change **RESIDUAL FM IN FM AND CW MODES** Specifications to read:
SPECIFICATION: Noise and power line related
In CW and 30 kHz/V thru 3 MHz/V ranges
6 Hz-rms in 20 Hz—1 kHz post detection bandwidth
12 Hz-rms in 20 Hz—3 kHz post detection bandwidth
In 10 MHz/V range
10 Hz-rms in 20 Hz—1 kHz post detection bandwidth
20 Hz-rms in 20 Hz—1 kHz post detection bandwidth
Residual FM doubles in the 6.2—12.4 GHz range;
triples in the 12.4—18.0 GHz range.

Page 4-30, paragraph 4-23, step 6:
Change first line to read "On the modulation analyzer press the following keys: FM, AVG, and 3 kHz LOW PASS FILTER."

CHANGE AV (cont'd)

Page 4-30, paragraph 4-23:
Replace steps 7 through 13 with the following four steps.

7. Because two independent instruments are being measured, divide the reading by two to obtain probable residual FM for a single instrument. This assumes the two instruments are of equal performance. The result should be less than 12 Hz in a 20 Hz to 3 kHz post detection bandwidth. The modulation analyzer does not contain a 1 kHz low pass filter so that portion of the specification will not be measured.

   2.000 — 6.199 GHz 12 Hz-rms _____

8. Set the local oscillator to 12 220 MHz and the Unit Under Test to 12 200 MHz. Measure the residual FM in steps 6 and 7. The results should be less than 24 Hz.

   6.200 — 12.399 GHz 24 Hz-rms _____

9. Set the local oscillator 14 000 MHz and the Unit Under Test to 14 020 MHz. Measure the residual FM as in steps 6 and 7. The results should be less than 36 Hz.

   12.400 — 18.000 GHz 36 Hz-rms _____

10. If the residual FM is not within the required tolerance, perform the Single-Sideband Phase Noise Performance Test.

Page 4-35, paragraph 4-25:
Change SPECIFICATIONS to read:
SPECIFICATION: At rates ≤10 kHz and 30% AM depth, incidental FM shall be:
less than 5 kHz (0.5 radians) fro 2.0 to 6.2 GHz
less than 15 kHz (1.5 radians) fro 6.2 to 12.4 GHz
less than 10 kHz (1.0 radians) fro 12.4 to 18 GHz.

Page 4-36, paragraph 4-25, step 17:
Change ". . ≥2.35 dB . . ." to read ". . ≥5 dB . . .".
Change 2.35 dB down to 5 dB down.

Page 4-48, Table 4-4 (3 of 5):
For paragraph 4-23, substitute with the following.

4-23.	**RESIDUAL FM IN FM AND CW MODES**			
	20 Hz — 3 kHz Post Detection Bandwidth			
	2.000 — 6.199 GHz		_____	12 Hz-rms
	6.200 — 12.399 GHz		_____	24 Hz-rms
	12.400 — 18.000 GHz		_____	36 Hz-rms

CHANGE AW

Table 6-3:
Change A1A11 to 08672-60048.
Delete A1A11R27.
Delete A1A11U11.
Change A1A14 to 08672-60127.
Change A2A10 to 08672-60139.
Add A2A10R13, 0757-0438, RESISTOR 5.11K 1% .125W.
Delete A2A10R21.

CHANGE AW (Cont'd)

Table 6-3 (cont'd)
Delete A2A10U26.
Delete A2A10U27.
Change A2A11U24 to 08672-80011.
Change A2A12 to 08672-60137.
Change A2CR2 to 1901-0518.

Service Sheets 1-A1 through 8-A1:
Change A1A14 to 08672-60127.

Figure 8-41:
Delete U11 and R27.

Figure 8-69:
Delete U26 and U27.
Delete R21.
Add R13 between R14 and L1.

Service Sheet 5-A2 (schematic):
Delete the off-page connection marked (CZ)7-A2. Label the line "NC."

Service Sheet 6-A1 (schematic):
Delete the off-page connector 7-A2(HS) and the line labeled EXT REF. Substitute Figure 7-9 for the appropriate part of the schematic. Delete U11 from the Table of Transistor and Integrated Circuit Part Numbers.

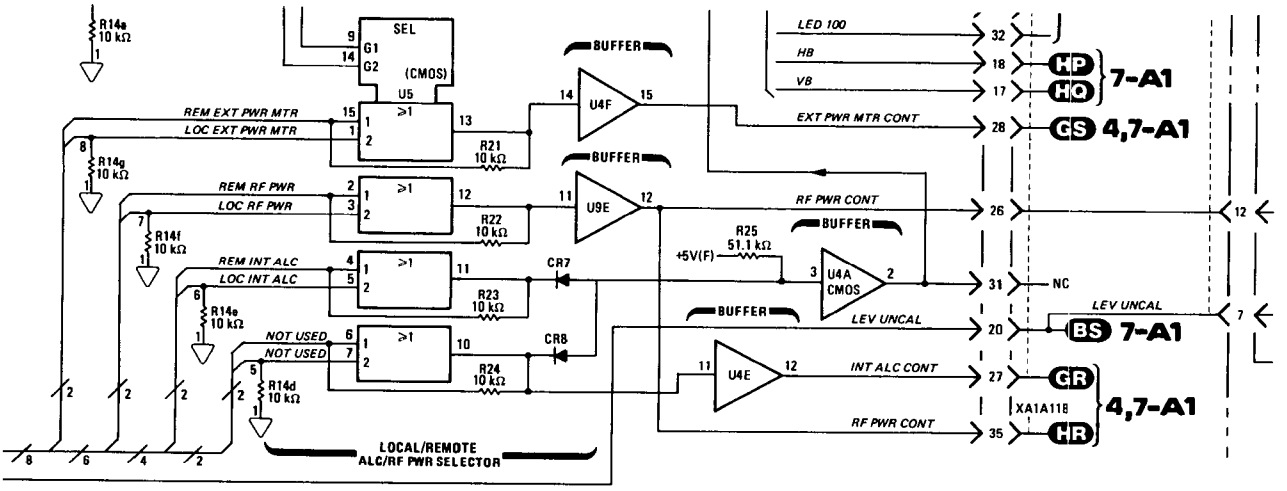


Figure 7-9. P/O Digital Control Schematic Diagram (P/O Change AW)

Service Sheet 7-A2 (schematic):
Change A2A10 to 08672-60139.
Substitute Figure 7-10 for the appropriate part of the schematic.

Service Sheet 13-A2 (schematic):
Connect the line from J1 pin 19 to A2A1U3 pin 10 instead of pin 6. Remove the label NC>

Service Sheets 1-A2 through 13-A2:
Change A2A12 to 08672-60137.

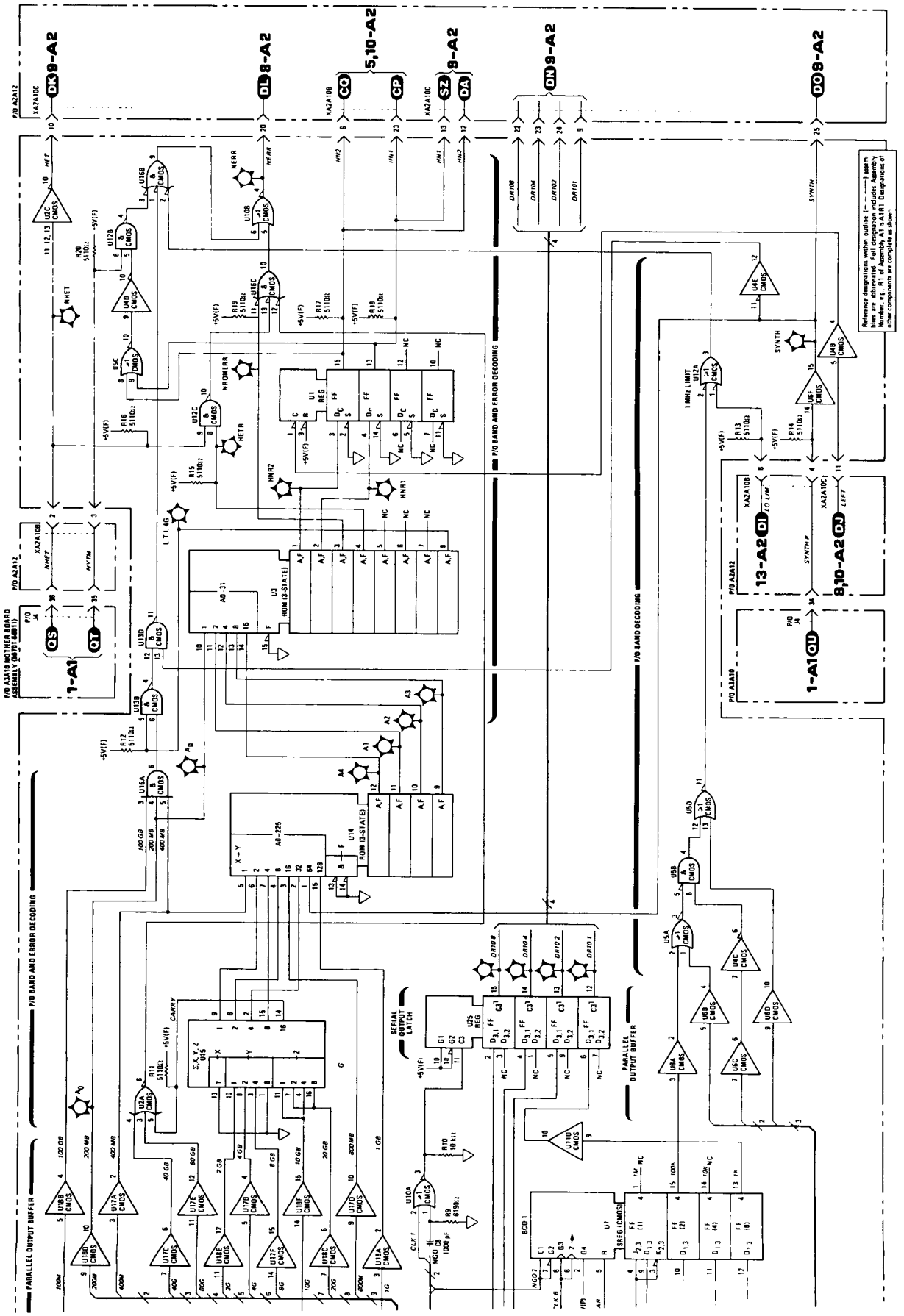


Figure 7-10. P/O Register 1 Assembly Schematic Diagram (P/O Change AW)

CHANGE AX

Table 6-3:

A1DS2 and A1DS3 were originally 1990-0506. However, the new parts listed in Table 6-3 are the recommended replacements. Therefore, no manual change is recommended. These parts may be replaced independently of the others listed in this change.

A1W8 RF Output Cable, including A3J6 (Option 004 only) was originally 8120-2473. The new parts for A1W8 and A3J6 listed in Table 6-3, with the hardware listed, are the recommended replacements. Therefore, no manual change is recommended.

A2DS5-8 were originally 1990-0506. However, the new parts listed in Table 6-3 are the recommended replacements. Therefore, no manual change is recommended. These parts may be replaced independently of the others listed in this change.

A3A1A5L2 was originally 9100-0346 (50 nH). However, the new part listed in Table 6-3 is the recommended replacement. Therefore, no manual change is recommended. This part may be replaced independently of the others listed in this change.

A3A3R59 was originally 0757-0447 (16.2 kohms). However, the new part listed in Table 6-3 is the recommended replacement. Therefore, no manual change is recommended. This part may be replaced independently of the others listed in this change.

A3A9A5C10 was originally 0160-2264 (20 pF). However, the new part listed in Table 6-3 is the recommended replacement. Therefore, no manual change is recommended. This part may be replaced independently of the others listed in this change.

A3J6, Connector, RF Output, Option 004 only, (listed under A3 Chassis Parts) was originally not separately replaceable, part of A1W8. The recommended replacement is the part for A1W1 already listed in Table 6-3, together with the new A3J6 Connector and hardware listed. Therefore, no manual change is recommended.

Service Sheet 5-A3 (schematic):

A3A1A5L2 was originally 50 nH. However, the part shown on the schematic is the recommended replacement. Therefore, no manual change is recommended.

Service Sheet 8-A3 (schematic):

A3A9A5C10 was originally 20 pF. However, the part shown on the schematic is the recommended replacement. Therefore, no manual change is recommended.

Service Sheet 12-A3 (schematic):

A3A3R59 was originally 16.2 kohms. However, the part shown on the schematic is the recommended replacement. Therefore, no manual change is recommended.

SECTION VIII
SERVICE

8-1. INTRODUCTION

8-2. This section provides information on service related subjects. Safety considerations include warnings and cautions to be observed while servicing the instrument. The arrangement of the principles of operation and troubleshooting is explained. Repair information such as non-repairable items, module exchange and disassembly and reassembly procedure are included.

8-3. The service sheets are in the foldout section. Each service sheet includes a block or schematic diagram, with accompanying principles of operation and troubleshooting information. Usually a component location diagram is also included. Figure 8-1 Schematic Diagram Notes provides general information which relates to block and schematic diagram symbols.

8-4. Other pertinent service information is included throughout the section.

8-5. SAFETY CONSIDERATIONS

8-6. This section contains warnings and cautions which must be followed for your protection and to avoid damage to the equipment.

WARNING

Maintenance described herein is performed with power supplied to the instrument and with protective covers removed. Such maintenance should be performed only by service-trained personnel who are aware of the hazards involved. Where maintenance can be performed without power supplied, the power should be removed.

8-7. Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible and, when inevitable, should be carried out only by a skilled person who is aware of the hazard involved.

8-8. Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

8-9. Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, etc.) are used for replacement. The use of repaired fuses and the short-circuiting of fuseholders must be avoided.

8-10. Whenever it is likely that this protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

8-11. PRINCIPLES OF OPERATION

8-12. The operation of the Synthesizer is explained on each service sheet. Overall operation, in terms of interaction of the major assemblies, is found on Service Sheet 1. Each major assembly. is broken down into sections (groups of assemblies) on Service Sheets 2, 3 and 4. Remaining service sheets review the section operating information and explain the assembly operation to the stage (group of components) level.

8-13. TROUBLESHOOTING

NOTE

If the Synthesizer malfunctions, begin troubleshooting on Service Sheet 1.

8-14. Arrangement in Manual

8-15. The troubleshooting information for the Synthesizer is found on each service sheet. If the Synthesizer malfunctions, begin troubleshooting with Service Sheet 1 to isolate the defect to a major assembly. On Service Sheets 2, 3, and 4, troubleshoot to the section level (a logical group of assemblies). Next, isolate the defective assembly by following the information on the key Service Sheet for the section. With the remaining information on the key service sheet (which applies to the assembly) on the remaining service sheets, isolate the defective stage. Continue troubleshooting to defective component.

8-16. Supplemental Troubleshooting Aids

8-17. The HP-IB Diagnostic Program may verify that the HP-IB input to the Synthesizer is operat-

SCHEMATIC DIAGRAM NOTES

Resistance in ohms, capacitance in microfarads, inductance in millihenries unless otherwise noted.

* Asterisk denotes a factory-selected value. Value shown is typical. Part may be omitted.

Tool-aided adjustment. ○ Manual control.

Encloses front-panel designation.

Encloses rear-panel designation.

Circuit assembly borderline.

Other assembly borderline. Also used to indicate mechanical interconnection (ganging).

Heavy line with arrows indicates path and direction of main signal.

Heavy dashed line with arrows indicates path and direction of main feedback.

CW Wiper moves toward CW with clockwise rotation of control (as viewed from shaft or knob).

1 Numbered Test Point. Measurement aid provided.

A Lettered Test Point. No measurement aid provided.

Encloses wire color code. Code used is the same as the resistor color code. First number identifies the base color, second number identifies the wider stripe, and the third number identifies the narrower stripe, e.g., (947) denotes white base, yellow wide stripe, violet narrow stripe.

A direct conducting connection to the earth, or a conducting connection to a structure that has a similar function (e.g., the frame of an air, sea, or land vehicle).

A conducting connection to a chassis or frame.

Common connections. All like-designated points are connected.

Letters = off page connection, e.g., AA

AA3-A3 Number = Service Sheet number for off-page connection, e.g., 3

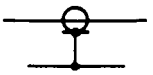
Letter number = Service Sheet Assembly Number. A3

1 THIS PAGE Number (only) = on page connection.

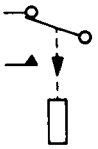
A, B, C, A, 3, 2 Indicates multiple paths represented by only one line. Letters or names identify individual paths. Numbers indicate number of paths represented by the line.

Figure 8-1. Schematic Diagram Notes (1 of 3)

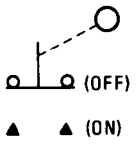
SCHEMATIC DIAGRAM NOTES



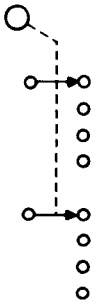
Coaxial or shielded cable.



Relay contact moves in direction of arrow when energized.



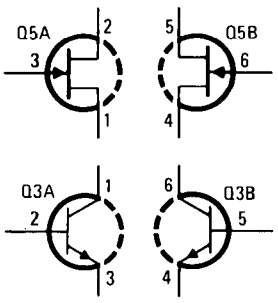
Indicates a pushbutton switch with a momentary (ON) position.



Indicates a ganged 2-section 4-position rotary switch.



Indicates a Schottky (hot-carrier) diode.



Dual Transistors — Physical location of the pins is as shown.

NSTOR Signals that are active-low, are identified by the letter N followed by a signal mnemonic (such as NSTOR).

STOR Signals that are active-high are identified by a signal mnemonic (such as STOR).



Identification of logic families is as shown (in this case, ECL). For more information on logic symbols, refer to the paragraph entitled Logic Symbols in Section VIII.

Figure 8-1. Schematic Diagram Notes (2 of 3)

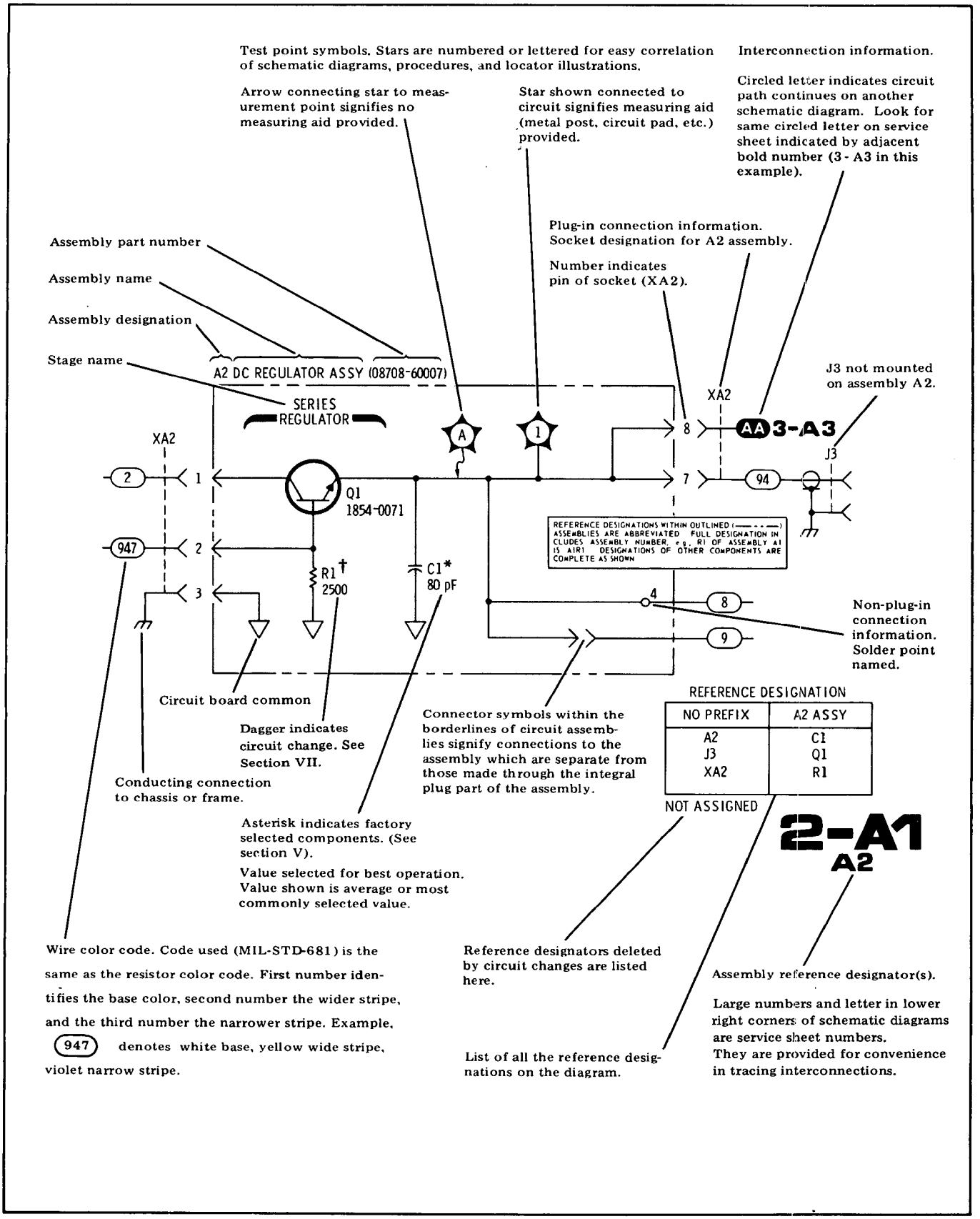


Figure 8-1. Schematic Diagram Notes (3 of 3)

Supplemental Troubleshooting Aids (Cont'd)
ing properly. The program will not isolate a remote problem but it may give some indication of what the actual problem is. A remote operator's check, found near the last page of this manual, checks the various functions of the Synthesizer when the HP-IB controller and bus are operating correctly.

8-18. An Operational Verification Check, located before the performance tests in Section IV, may be used to check the performance of the instrument without an excessive outlay of time.

8-19. Table 5-2 (in Section V) may aid in isolating a circuit defect in the event of a performance test failure.

8-20. RECOMMENDED TEST EQUIPMENT

8-21. Test equipment and test equipment accessories required to maintain the Synthesizer are listed in Table 1-2. Equipment other than that listed may be used if it meets the listed critical specifications.

8-22. SERVICE AIDS

8-23. Pozidriv Screwdrivers. Many screws in the instrument appear to be Phillips, but are not. To avoid damage to the screw slots, Pozidriv screwdrivers should be used.

8-24. Blade Tuning Tools. For adjustments requiring a non-metallic tuning tool, use the J.F.D.. Model No. 5284 (HP 8710-1010). In situations not requiring non-metallic tuning tools, an ordinary small screwdriver or other suitable tool is sufficient. No matter what tool is used, never try to force any adjustment control in this instrument. This is especially critical when adjusting variable inductors or capacitors.

8-25. Part Location Aids. The locations of some chassis-mounted parts and the major assemblies are shown on or near the last foldout of this manual. The locations of individual components mounted on printed circuit boards or other assemblies are shown on the service sheet.

8-26. *Servicing* Aids on Printed Circuit Boards. The servicing aids include test points, transistor and integrated circuit designations, adjustment callouts, and assembly stock numbers.

8-27. REPAIR

8-28. After a circuit board is repaired, it is recommended that the area surrounding the new component be sprayed with a protective coating.*

8-29. Factory Selected Components

8-30. Some component values are selected at the time of final checkout at the factory (see Table 5-1). Usually these values are not extremely critical; they are selected to provide optimum compatibility with associated components. These components are identified on individual schematics by an asterisk (*). The recommended procedure for replacing a factory-selected part is as follows:

a. Try the original value, then perform the calibration test specified for the circuit in the performance and adjustment sections of this manual.

b. If calibration cannot be accomplished, try the typical value shown in the parts list and repeat the test.

c. If the test results are still not satisfactory, substitute various values within the tolerance specified in Table 5-1 until the desired result is obtained.

8-31. Non-Field Repairable Assemblies

8-32. A few of the Synthesizer's assemblies must be replaced if they malfunction. If they are repairable, they may be returned to the factory under the Module Exchange Program (refer to the next paragraph). The following assemblies are not repairable:

A1A13	YTM Assembly
A1A12	Power Amplifier (if the power amplifier is defective, replace the entire A1A12 Assembly).
A1A13A1	Preamplifier Assembly (if defective, replace the entire A1A13 Assembly).
A1AT2	Isolator
A1AT3	Pin Modulator
A1CR1	Leveling Detector
A1DC1	Directional Coupler
A1FL1	High Pass Filter
A2A2	Rotary Pulse Generator
A3A9U1	Sampler 2—6.5 GHz
A3A9A1	Directional Coupler Assembly
A3A9A2	YTO Interconnect Assembly
A3A9A6	Attenuator Assembly, 15 dB
A3A9A7	6.3 GHz Low Pass Filter Assembly
A3A11	Power Line Module

*Such as "Krylon" No. 1301 by Borden Inc., Department CP Columbus, Ohio 43215.

8-33. Module Exchange Program

8-34. The restored assemblies listed below may be ordered as replacements under the Module Exchange Program.

A1AT1	Programmable Attenuator Assembly
A1A3	YTM Assembly
A3A1A4	M/N VCO Assembly (if A3A1A4A1 is defective, replace the entire assembly).
A3A8	10 MHz Reference Oscillator Assembly
A3A9A3	2—6.2 GHz YTO Assembly

Refer to Section VI for ordering information.

8-35. After Service Product Safety Checks

8-36. Visually inspect interior of instrument for any signs of abnormal internally generated heat, such as discolored printed circuit boards or components, damaged insulation, or evidence of arcing. Determine and remedy cause of any such condition.

8-37. Using a suitable ohmmeter, check resistance from instrument enclosure to ground pin on power cable plug. The reading must be less than one-half ohm. Flex the power cable while making this measurement to determine whether intermittent discontinuities exist.

8-38. Check any front or rear panel terminals marked as ground, using the procedure in paragraph 8-37.

8-39. Check resistance from instrument enclosure to the line and neutral (tied together) with the power switch on and the power source disconnected. The minimum acceptable resistance is two megohms.

8-40. Check line fuse (A3F1) to verify that a correctly rated fuse is installed (refer to Section II).

8-41. Disassembly and Reassembly Procedures

WARNINGS

Maintenance described herein is performed with power supplied to the instrument and with protective covers removed. Such maintenance should be performed only by service-trained personnel who are aware of the hazards involved. Where maintenance can be performed without power supplied, the power should be removed.

A pin-to-pin voltage difference of 60 Vdc may be found on many of the Synthesizer's circuit board connectors. This voltage could cause personal injury if contacted. Be careful while working on the circuit boards with power supplied to the instrument.

If a circuit board is placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. This voltage could cause personal injury if contacted. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

8-42. Before performing any of the following disassembly or reassembly procedures, the following steps must be performed.

a. Set the LINE switch to STANDBY.

b. Remove the Line Power Cable from the Line Module (A3A11).

8-43. Top Cover Removal. To remove the top cover from the Synthesizer, follow the steps as listed below:

a. Remove the two plastic feet from the rear of the top cover by removing the Pozidriv screw from each foot (see Figure 8-2).

b. Unscrew the Pozidriv screw at the middle of the rear edge of the top cover (see Figure 8-2). This is a captive screw and will cause the top cover to pull away from the front frame. Captive screw part number HP 0560-1171; clip part number HP 0510-0043.

c. Lift the top cover off the Synthesizer.

8-44. A1 Assembly Protective Cover Removal. To remove the protective cover, follow the steps listed below:

a. Remove the eight Pozidriv screws from the protective cover.

b. Move the cables toward the rear of the Synthesizer. Lift the protective cover from the A1 Assembly.

8-45. A2 Assembly Protective Cover Removal. To remove the protective cover, follow the steps as

Disassembly and Reassembly Procedures (Cont'd)

listed below:

a. Remove the Pozidriv screw at the rear of the protective cover.

b. Lift up the rear portion of the protective cover and slide towards the rear of the Synthesizer to allow the front edge pins to disengage from the guide slots.

8-46. Bottom Cover Removal. To remove the bottom cover from the Synthesizer, follow the steps as listed below:

a. Place the Synthesizer upside down.

b. Remove the two plastic feet from the rear of the bottom cover by removing the Pozidriv screw from each foot (see Figure 8-2).

c. Unscrew the Pozidriv screw at the middle of the rear edge of the bottom cover (see Figure 8-2). This is a captive screw and will cause the front edge of the bottom cover to pull away from the front frame. Captive screw part number is HP 0570-1171; clip part number is HP 0510-0043.

d. Lift the bottom cover off the Synthesizer.

8-47. Front Panel Removal. To remove either the A1 or A2 Assembly Front Panel, follow the steps as listed below:

a. Place the Synthesizer upside down.

b. Remove the plastic foot on the A2 Assembly side of the instrument.

c. Remove the two Pozidriv screws from the bottom edge of the front frame over the front panel.

d. Place the Synthesizer with top side up.

e. Remove the top plastic trim strip from the front frame.

f. Remove the two Pozidriv screws from the top edge of the front frame over the front panel.

g. Carefully, pull the front panel outward to clear the front frame (see Figure 8-3).

h. Disconnect the cables and the wiring as necessary to free the front panel.

i. Remove the two Pozidriv screws from the hinge and remove the front panel.

8-48. Fan Removal and Replacement. To remove the fan from the Synthesizer, follow the steps listed on page 8-9.

WARNING

The fan and fan relay always have 120 Vac across the terminals if the instrument is connected to the Mains (line) voltage. BE SURE the instrument is disconnected before removing the fan.

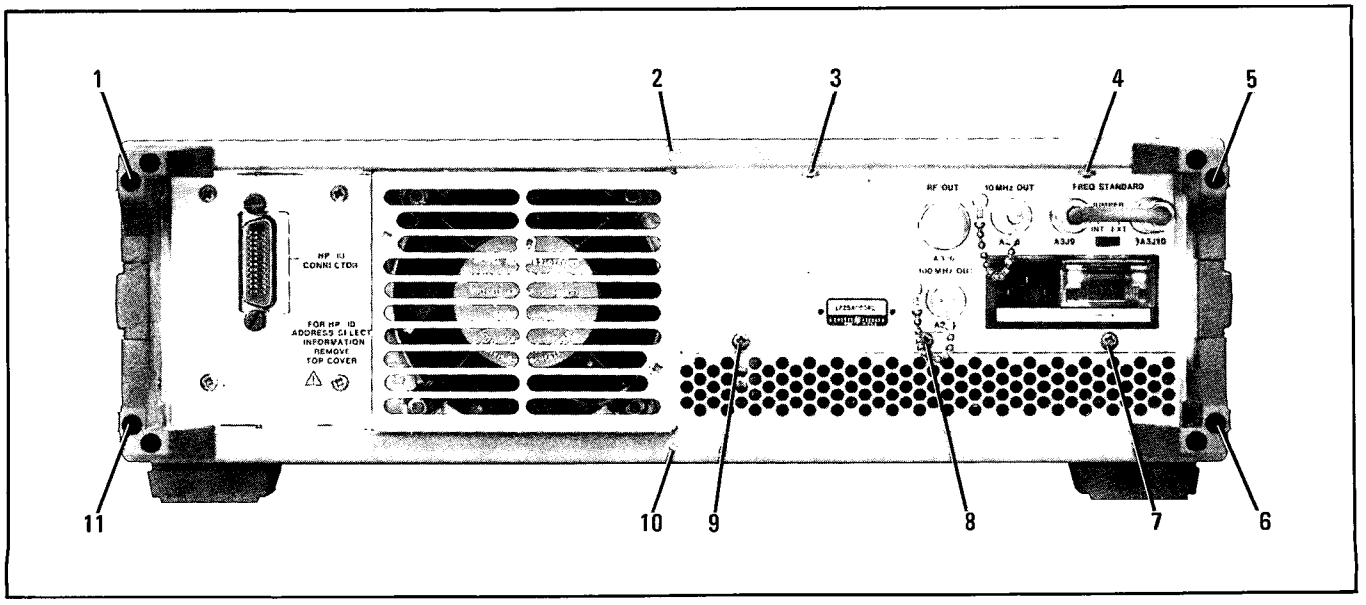


Figure 8-2. Rear Panel of the Synthesizer

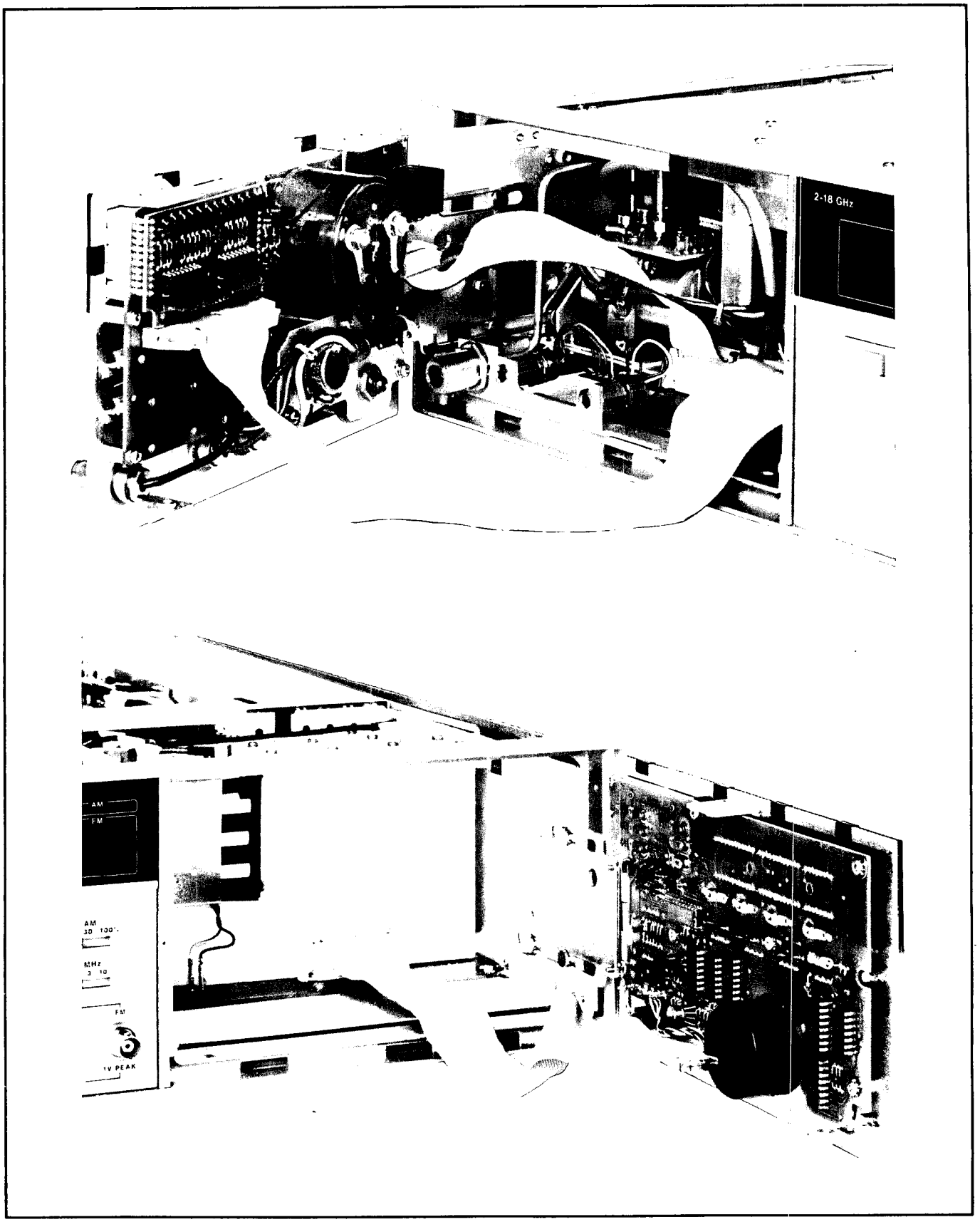


Figure 8-3. A1 and A2 Assembly Front Panel Fully Extended

Disassembly and Reassembly Procedures (Cont'd)

a. Remove the bottom cover from the Synthesizer as in paragraph 8-46.

b. Remove two Pozidriv screws from the fan cowl and remove the cowl.

c. Remove the clear plastic protective cover from the bottom of the Synthesizer by removing the five white circled screws (see Figure 8-4).

d. Remove the plastic clamp holding the three wires going to the fan from the Mother Board.

e. Unsolder the two black (06 and 09) wires from the Mother Board. Remove the screw from the ground wire.

f. Pull the three wires out of the rear frame going to the fan.

g. Remove the four nuts and lockwashers from the fan mounting brackets.

h. Carefully remove the fan from the mounting bracket. Do not lose any of the hardware.

i. Before replacing the fan, check to see that the magnetic shield is securely in place on the blade side of the fan motor.

j. Reassemble the fan in the reverse order. When tightening the four nuts and lockwashers, be careful that the four rubber shock mounts do not twist with the nuts as they are tightened. Be sure the wires go around the outside of the fan strut (away from the fan blade).

WARNING

BE SURE to replace the A3 Assembly's protective plastic cover before replacing the bottom cover. This cover is intended to provide protection from electrical shock when the bottom cover is removed.

k. Replace the cable clamp and MAKE SURE that the plastic protective cover is replaced before replacing the bottom cover.

8-49. Rear Panel Removal. To remove the rear panel for access to the Line Module (A3A11), fan relay (A3K1), transistors (A3Q1-Q4), and the rear panel coax connectors, follow the steps listed below:

a. Remove the top cover as in paragraph 8-43.

b. Remove the two Pozidriv screws from the top of the rear frame and the three screws from over the heat sink (see Figure 8-2).

c. Push the top of the panel outward. The transistors (A3Q1-Q4) can be replaced by removing the two Pozidriv screws holding them in place.

8-50. A3A1 M/N Loop Assembly Removal. To remove the A3A1 Assembly from the Synthesizer follow the steps as listed below:

a. Remove the top and bottom covers as in paragraphs 8-43 and 8-46.

b. Set the Synthesizer on its right side.

c. Remove the five coaxial cables from the A3A1 Assembly to free it from the other assemblies.

d. Remove the eight Pozidriv screws labeled B from the Mother Board, noting the sizes of each. These screws can be removed without removing the protective cover from the bottom of the Synthesizer.

e. Hold the A3A1 Assembly while removing the last screw. Then lift the assembly away from the Mother Board.

8-51. A3A9 YTO Loop Assembly Removal. To remove the A3A9 YTO Loop Assembly from the Synthesizer, follow the steps as listed below:

a. Remove the top and bottom covers as in paragraphs 8-43 and 8-46.

b. Remove the Pozidriv screw labeled "A" from the top of the A3A9 Assembly.

c. Disconnect the semi-rigid coax (A1W1) from A3A9A1J1. Loosen the cable at A1A13A1J1 and rotate it up and away from A3A9.

d. Remove the two Pozidriv screws labeled A from the bottom of the A3A9 Assembly through the Mother Board (see Figure 8-4).

e. Lift the assembly out until it clears the surrounding assemblies. Hook the front edge of the assembly over the front edge of the A3 Assembly as shown in Figure 8-5.

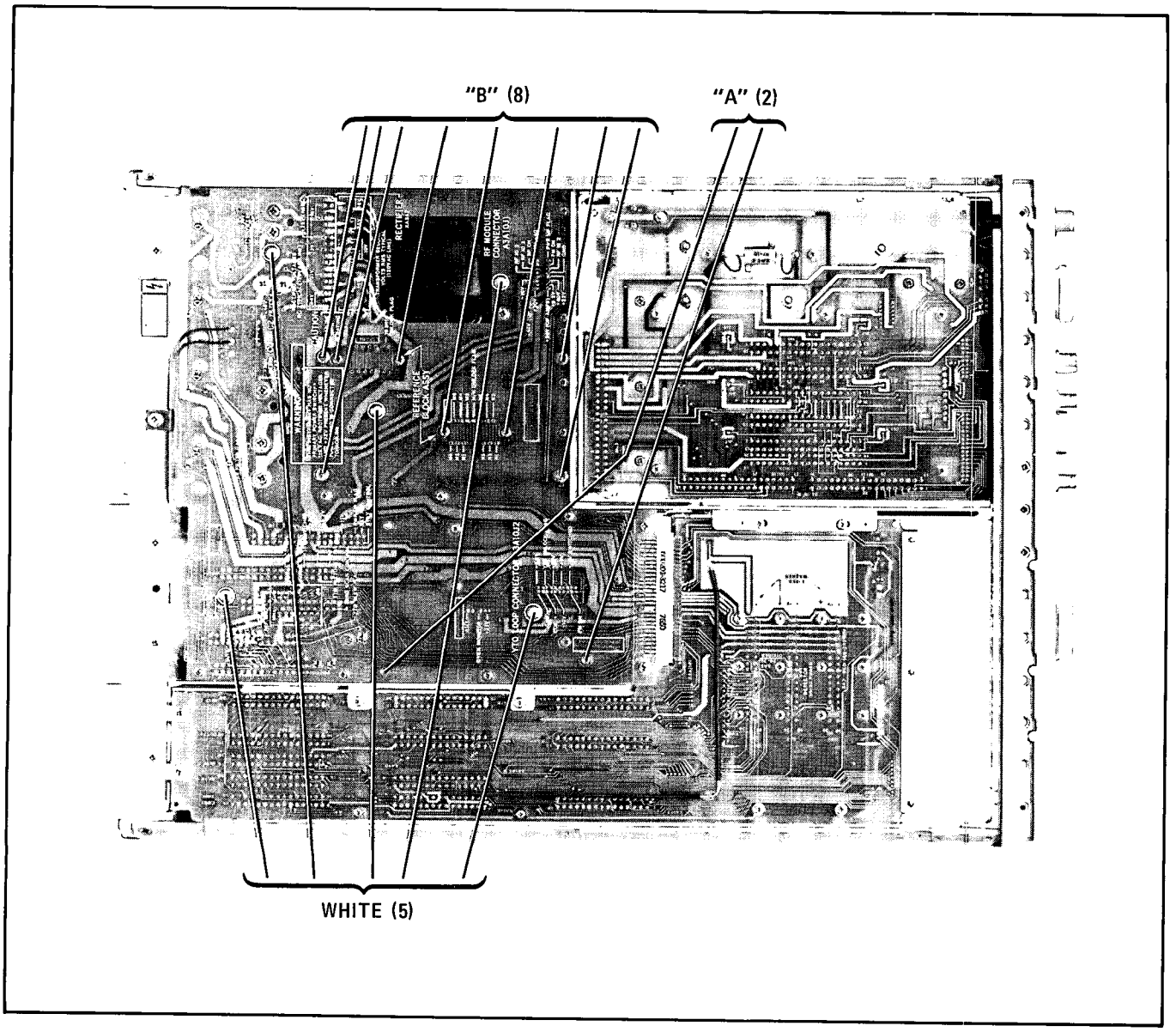


Figure 8-4. Bottom of the Synthesizer

Disassembly and Reassembly Procedures (Cont'd)

f. Secure the assembly into place by tightening the captive thumb screw into the pressed-in nut.

g. Connect a test cable from A3A9A1J1 to A1AT1J1 for troubleshooting and testing purposes.

CAUTION

When reinstalling the A3A9 Assembly, be careful not to crush or pinch the coaxial or flat ribbon cables.

8-52. A1 Assembly Removal. To remove the A1 Assembly from the Synthesizer, follow the steps listed below:

a. Remove the top cover.

b. Disconnect A1W1 from A1A13A1J1; loosen the cable at A3A9A1J1. Rotate the cable up and away from the A1 Assembly.

c. Remove the protective cover from the A1 Assembly.

d. Remove the A1A7, A1A8, and A1A9 boards.

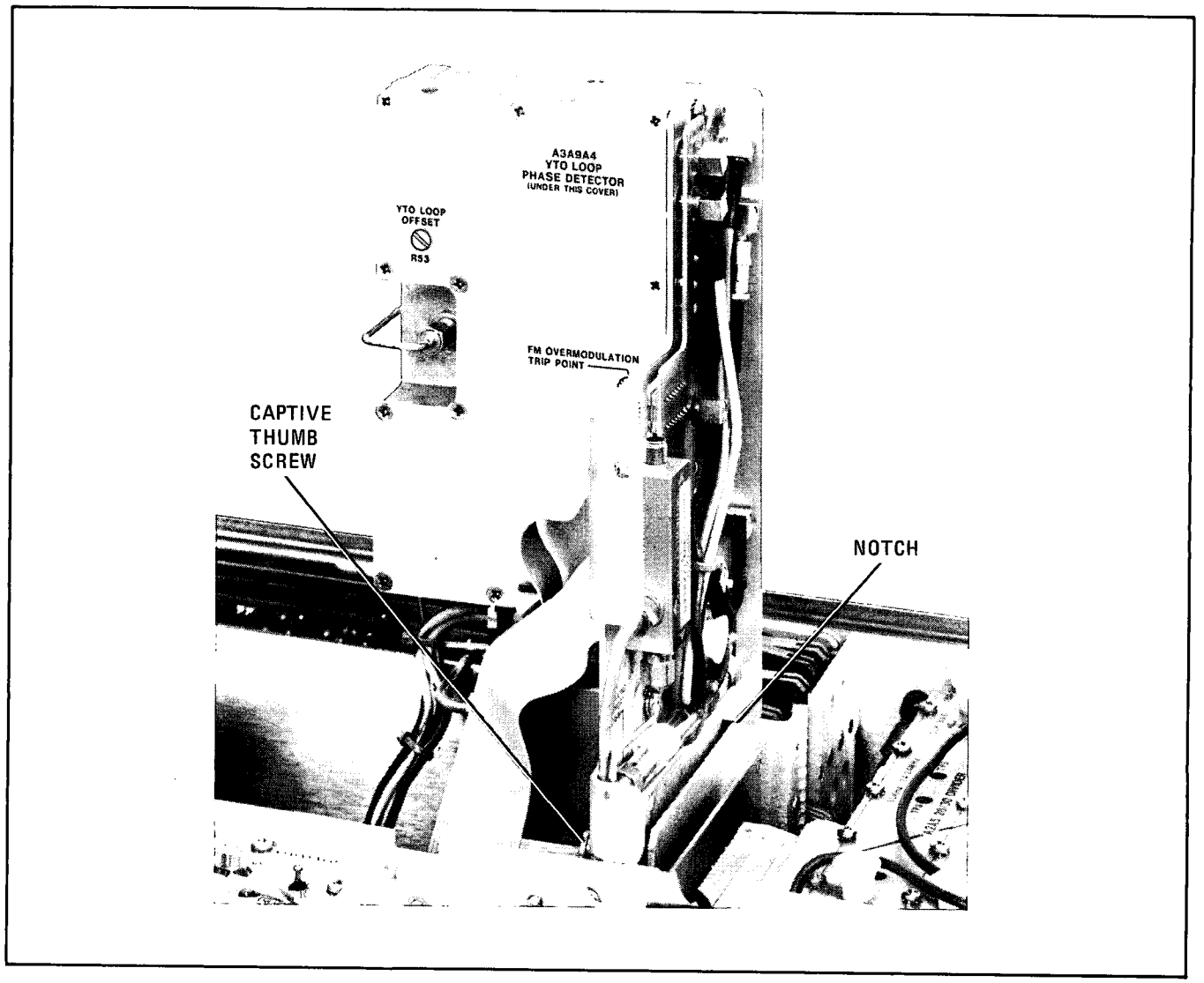


Figure 8-5. A3A9 Assembly in Service Position

Disassembly and Reassembly Procedures (Cont'd)

e. Disconnect the FM SIG (brown) and the YTM TUNE (yellow) coax connectors.

f. Set the Synthesizer on its right side with the A1 assembly up.

g. Remove the front frame top trim strip.

h. Remove the two Pozidriv screws from the top of the front frame.

i. Remove the trim strip from the bottom of the front frame.

j. Remove two Pozidriv screws from the bottom of the front frame.

k. Remove the two Pozidriv screws from the siderail handle. Lift the handle's end pieces from the side cover. Push the side cover toward the rear of the instrument and remove it.

l. Remove the six Pozidriv screws that secure the A1 Assembly to the siderail. Remove the two Pozidriv screws that secure the A1 and A2 assemblies to the center rail.

m. Pull forward on the brace in the A1 Assembly and it should start to slide out of the Synthesizer. Place the two coaxial cables so they clear the A1 Assembly.

8-53. A1A13A1 Preamplifier Assembly Removal. To remove the preamplifier assembly follow the procedure listed below.

Disassembly and Reassembly Procedures (Cont'd)

a. Remove the A1 Assembly.

b. Set the A1 Assembly on its right side.

c. Remove the three screws which hold the A1A12 Power Amplifier Assembly bracket in place. These screws are located on the bottom of the A1 Assembly nearest the rear panel.

d. Set the A1 Assembly upright.

e. Remove the blue cable that is connected to the A1AT3 Pin Modulator.

f. Remove the semi-rigid cable at the Preamplifier output. Loosen the cable at the modulator input and rotate it down toward the power amplifier.

g. On the rear panel of the A1 Assembly, remove the four screws that secure the Preamplifier.

h. Remove four screws (two to each multi-pin connector).

CAUTION

Do not let the coaxial connector jacks drag across the circuit board while removing the Preamplifier.

After removing the Preamplifier, tip it back so the inductor beads won't be lost.

i. Pull the A1A13 circuit board forward and remove the Preamplifier by sliding it up and between the chassis and circuit board.

NOTE

When re-installing the Preamplifier, position it so the pins will plug into the board correctly.

8-54. A1A2 Power Amplifier Assembly Removal. To remove the Power Amplifier Assembly, follow the procedure below.

a. Remove the A1 Assembly.

b. Set the A1 Assembly on its right side.

c. Remove the three screws that hold the Power Amplifier bracket in place. These screws are on the bottom of the A1 Assembly nearest the rear panel.

d. Set the A1 Assembly upright.

e. Remove both semi-rigid coaxial cables that are connected to the Power Amplifier Assembly.

f. Remove the flat-ribbon cable connector with a standard blade screwdriver.

g. Loosen the cable at the A1AT1 Pin Modulator output and move the other end away from the Power Amplifier.

h. Loosen the cable at the input to the A1AT2 Isolator. Raise the opposite end of the cable and re-tighten the connector slightly.

i. Slide the Power Amplifier Assembly and bracket out the right side of the A1 Assembly.

8-55. A1AT2 Isolator Removal. To remove the Isolator, follow the procedure below.

a. Remove the Synthesizer's top and bottom covers. (Refer to the appropriate procedures.)

b. Position the Synthesizer with the top side up.

c. Remove the A1 Assembly's protective cover. (Refer to the appropriate procedure.)

d. Disconnect the semi-rigid coaxial cables from the Isolator.

e. Set the Synthesizer on its right side.

f. Remove the four nuts that secure the Isolator with a 5/16-inch nut driver.

g. Lift the Isolator; slide it toward the rear and top of the A1 Assembly.

NOTE

When replacing the Isolator, make sure the rubberized RF Shield that surrounds the Isolator is folded flat underneath. Be sure the RF Shield between the Isolator and A1AT1 Programmable Attenuator is not wrinkled.

8-56. A1AT1 Programmable Attenuator Removal. The following procedure explains how to remove the Attenuator.

Disassembly and Reassembly Procedures (Cont'd)

a. Remove the Synthesizer's top cover. (Refer to the appropriate procedure.)

b. Remove the left side cover.

c. Set the Synthesizer with its top up.

d. Disconnect the semi-rigid coaxial cable at the Attenuator's input and output.

e. Remove the semi-rigid coaxial cable that is connected to the A1DC1 Directional Coupler.

f. Remove the two panhead Pozidriv screws through the left side frame that secure the Attenuator.

NOTE

While removing the Attenuator, be sure the surrounding rubberized RF Shield does not wrinkle or move.

g. Remove the large gray cable from its clamp. The clamp is located above the Attenuator at the rear of the A1 Assembly.

h. Slide the rear of the Attenuator up. Be careful not to put excessive pressure on the gray cable's connector.

i. Continue to slide the Attenuator up and out of the A1 Assembly.

j. To remove the gray cable's connector from the Attenuator, press on the top and bottom of the connector (close to Attenuator) and pull away.

NOTES

The following items must be considered for re-installing the Attenuator.

1. *The screws cannot be inserted into the Attenuator if the conductor rubber pad has moved.*
2. *The semi-rigid cable must be connected to the directional coupler before connecting it to the Attenuator.*
3. *Connect the semi-rigid cable to the Attenuator output jack.*
4. *Insert the large gray cable in its clamp.*

8-57. A1A3 YTM and A1FL1 High Pass Filter Removal. The following procedure explains how the YTM and filter are removed.

a. Remove the Synthesizer's top and bottom covers. (Refer to the appropriate procedures.)

b. Remove the A1 Assembly protective cover. (Refer to the appropriate procedure.)

c. Open the A1 Assembly front panel. (Refer to the appropriate procedure.)

d. Set the instrument on its right side.

e. Remove the two Pozidriv screws that secure the YTM.

f. Set the Synthesizer with its top up.

g. Remove the semi-rigid coaxial cable connector at the A1AT2 Isolator output.

h. Disconnect the cable connected at the YTM output.

i. Loosen the connector of the same cable at the Directional Coupler input. Rotate the cable up and away from the YTM.

j. Tip the front of the YTM up. Reach through the front panel opening and remove the screw that holds the cable clamp.

k. To remove the flat ribbon cable connector, push the red tabs back and pull the connector straight up.

l. Pass the YTM and High Pass Filter out through the front panel opening.

8-58. Battery Replacement. To replace the batteries, follow the steps listed below:

a. Remove top cover.

b. Grasp the top of the battery holder's clip and pull forward until it slips off.

c. Grip the battery pack on both sides with your fingers and pull straight out.

d. Position the new battery pack so the metal strips press against the flexible contacts of the battery holder.

Disassembly and Reassembly Procedures (Cont'd)

e. Slip the small end of the battery clip over the bottom end of the battery holder. Snap the top end of the clip into place.

8-59. LOGIC SYMBOLS

8-60. The logic symbols used in this manual are based on the American National Standard ANSI Y32.14-1973, "Graphic Symbols for Logic Diagrams (Two-State Devices)." The following summary should settle most questions of interpretation.

8-61. Qualifiers

8-62. Qualifiers are that portion of the symbol (either rectangular or distinctively shaped) that denotes the logic function. Refer to Figure 8-6.

8-63. Indicator Symbols

8-64. Indicator symbols identify the active state or level of a symbol's input or output. The more positive level is the high state; the less positive is the low state. Refer to Figure 8-8.

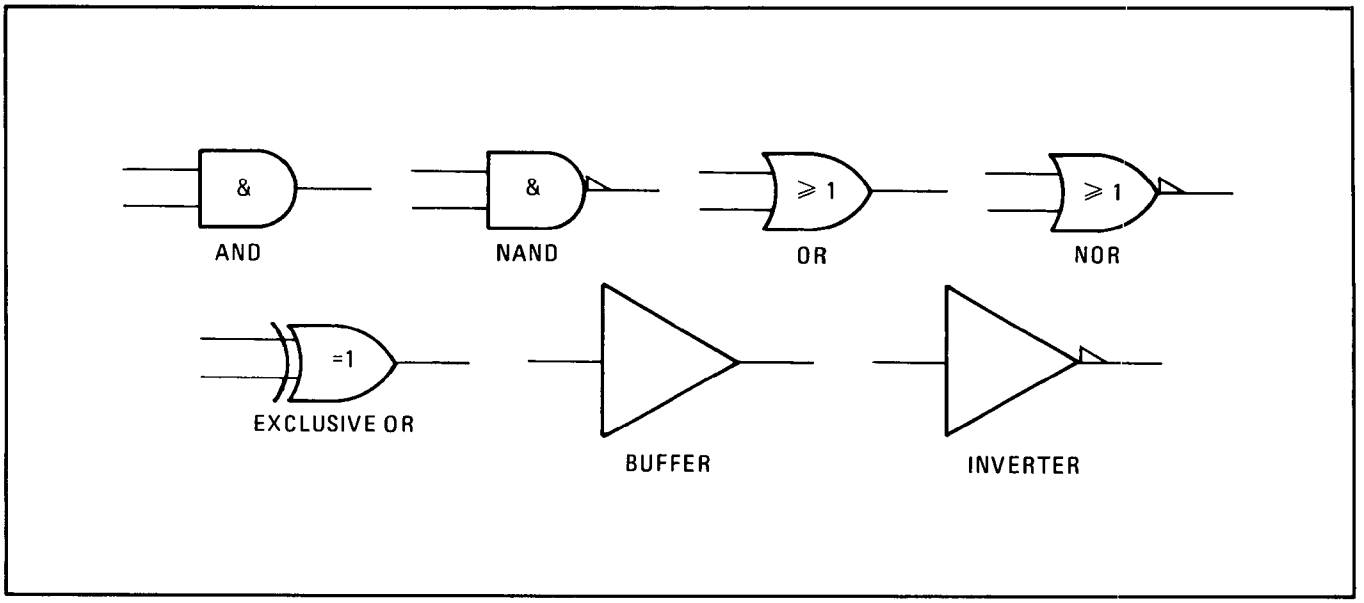


Figure 8-6. Qualifiers

8-65. Contiguous Blocks

8-66. Two symbols may share a common boundary parallel or perpendicular to the direction of signal flow. Note that in the examples shown in Figure 8-7, there is generally no logic connection across a horizontal line; however, there is always a logic connection across a vertical line. An exception to this is the Common Control Block (Figure 8-12) where there is a logic connection across a horizontal line.

8-67. Dependency Notation

8-68. Dependency Notation is a way to simplify symbols for complex IC elements by defining the existence of an AND relationship between inputs, or by the AND, OR, control, or free (switch) conditioning of an output by an input without actually showing all the elements and interconnections involved. The examples of Figure 8-9 and 8-10 use the letter "C" for control, "G" for gate (AND), "V" for OR and "F" for free. The dependent input or output is labeled with a number that is either prefixed (e.g., 1X) or subscripted (e.g., X_1). They both mean the same thing. Note that many times a controlled line may already be labeled with a number; as for example, a coder. In this case, the controlling or gating input will be labeled with a letter. See Figure 8-11.

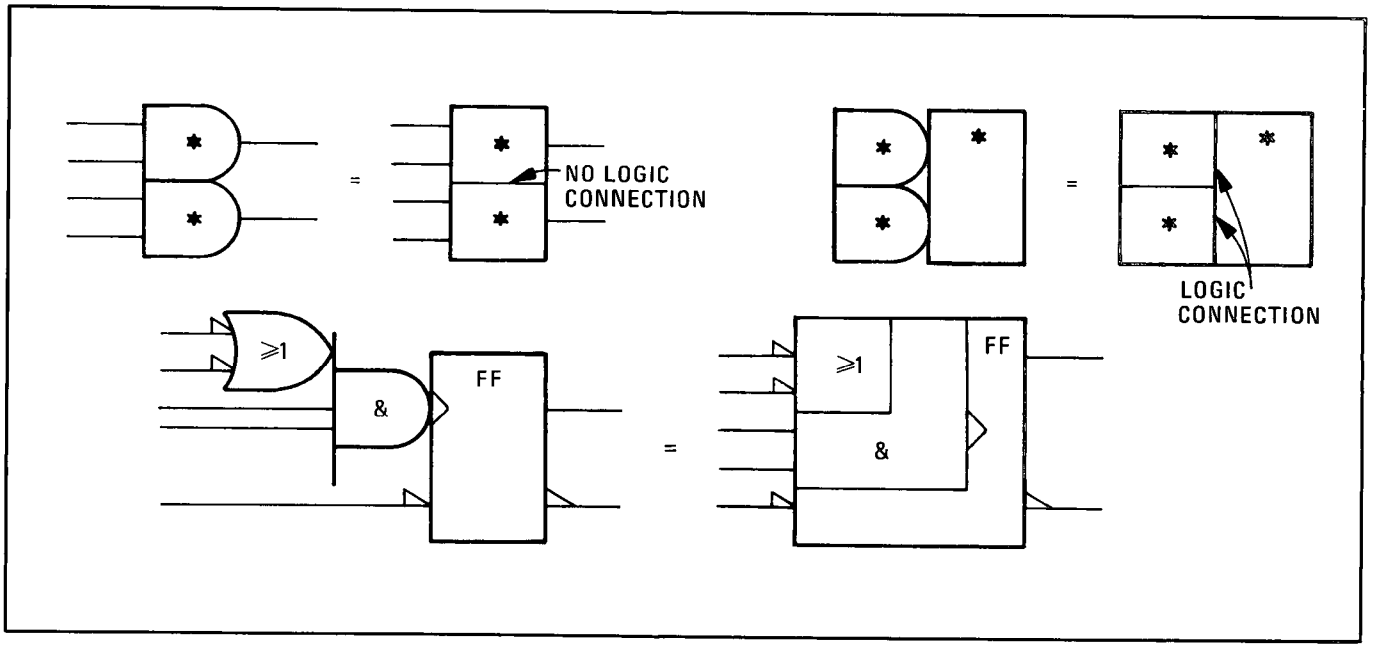
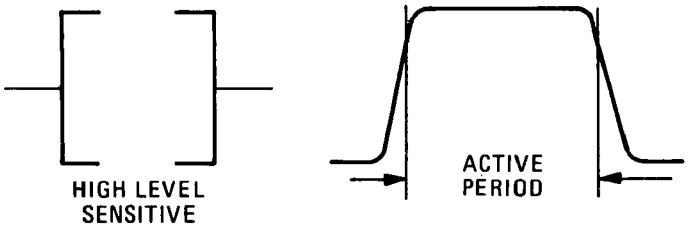
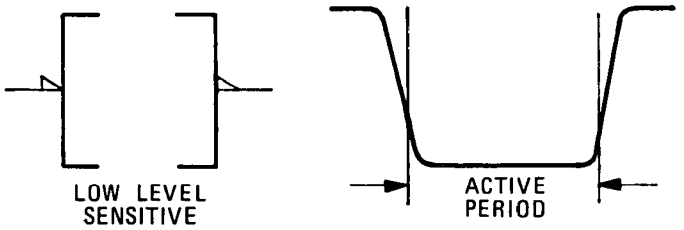


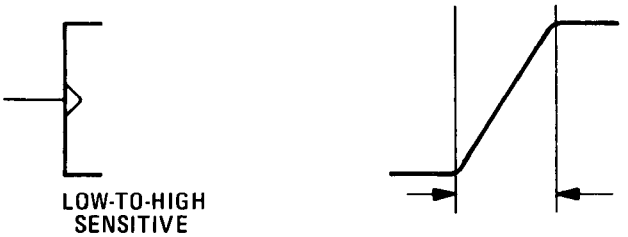
Figure 8-7. Contiguous Blocks



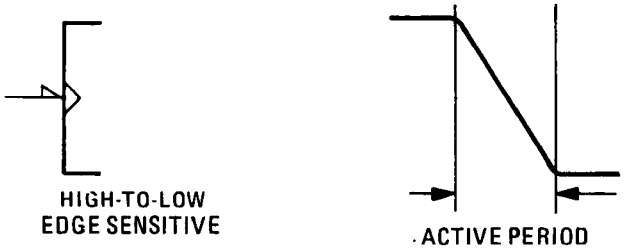
ACTIVE HIGH inputs and outputs are indicated by the absence of the polarity indicator symbol ( ).

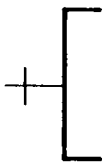


ACTIVE LOW inputs and outputs are indicated by the presence of the polarity indicator symbol ( ).

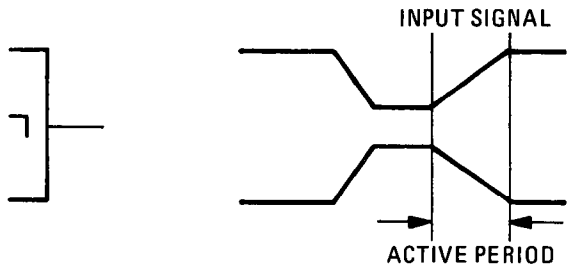


EDGE SENSITIVE (Dynamic) inputs are indicated by the presence of the dynamic indicator symbol ( ).

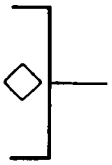




INHIBIT input (—) used when active input inhibits (blocks) the active state outputs of the logic function.



OUTPUT DELAY indicator symbol ( ) shows that an output becomes effective when the signal that initiated that change returns to its opposite state.



OPEN COLLECTOR OUTPUT. Output that forms part of a distributed connection.

Figure 8-8. Indicator Symbols

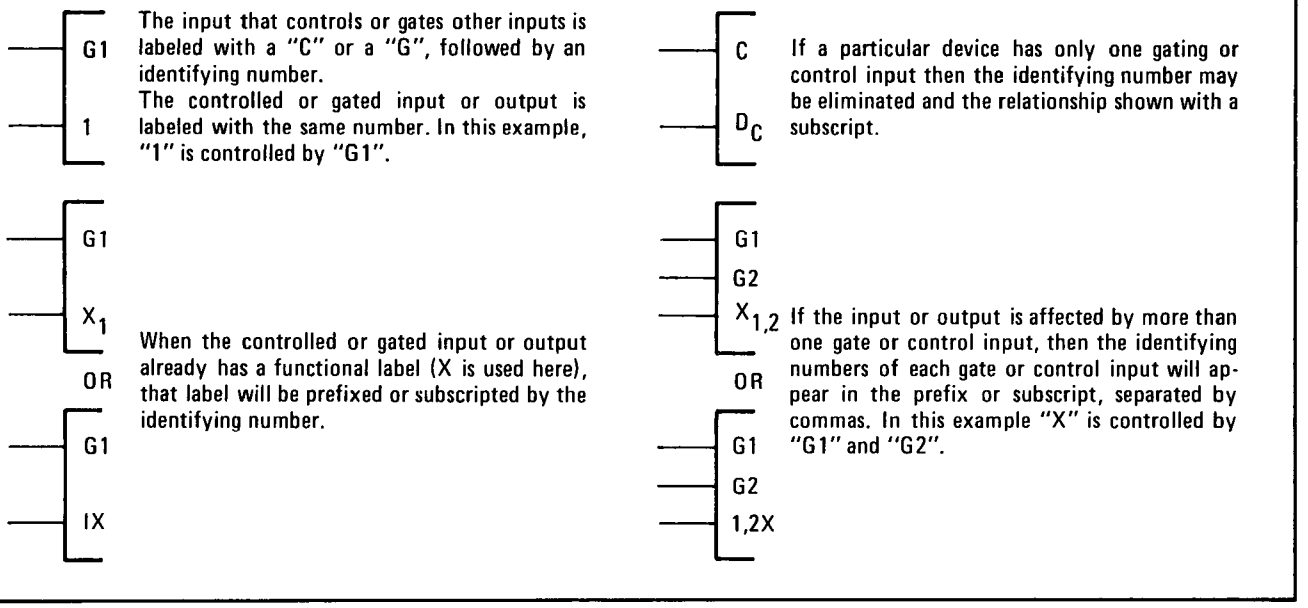


Figure 8-9. AND Dependency Notation

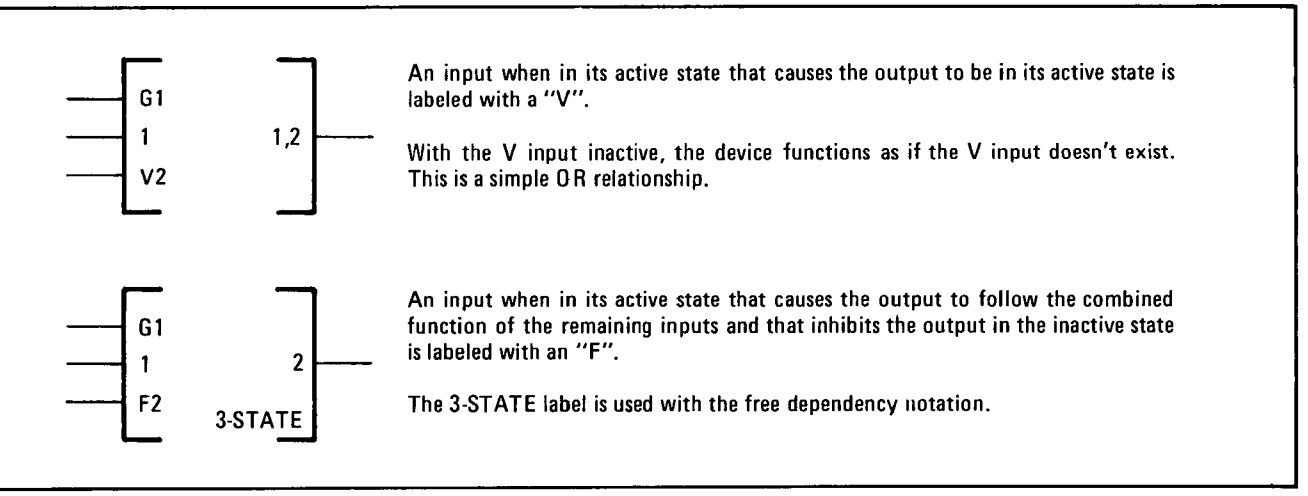


Figure 8-10. OR and Free Dependency Notation

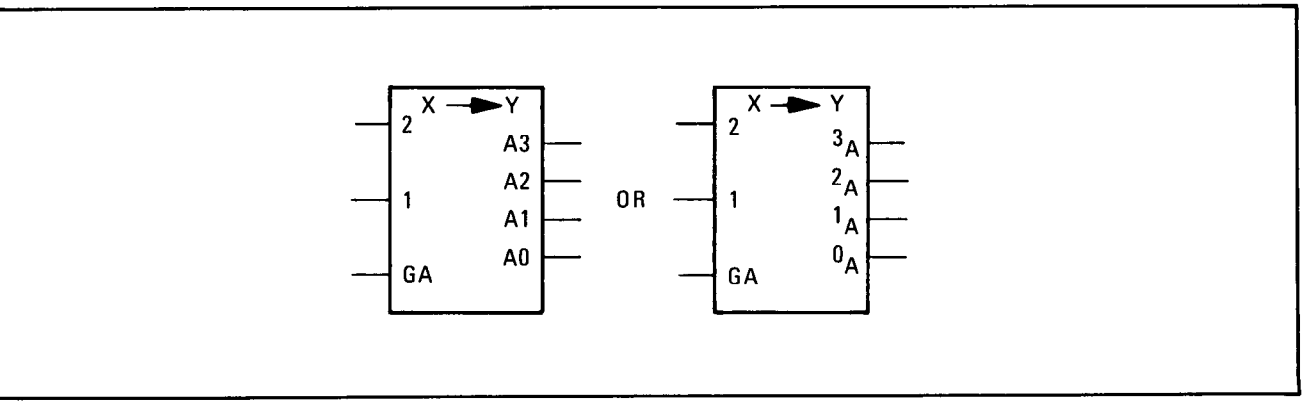


Figure 8-11. AND Dependency Notation, Coder Example Using Letters

8-69. Common Control Block

8-70. The Control Block is used in conjunction with an array of related symbols in order to group common logic lines. Figure 8-12 shows how the Control Block is usually represented. Figure 8-13 shows a quad D-Type flip-flop with reset. This can be redrawn by combining what is shown in Figures 8-12 and 8-13 about Contiguous Blocks and Common Control Blocks. The result is shown in Figure 8-14. Note that the more complex representation shown in Figure 8-13 might be used when the flip-flops are functionally scattered around the schematic (not used as a quad unit).

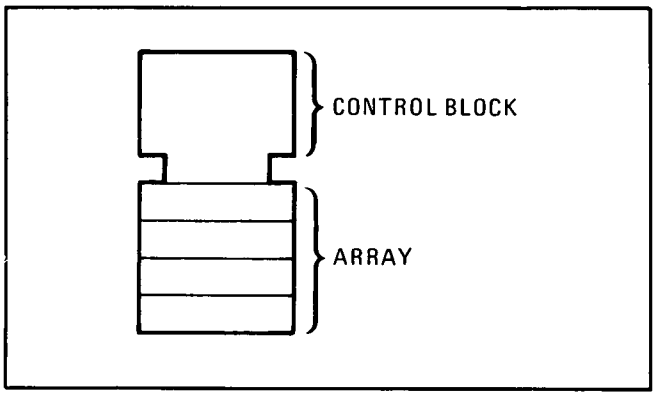


Figure 8-12. Common Control Block

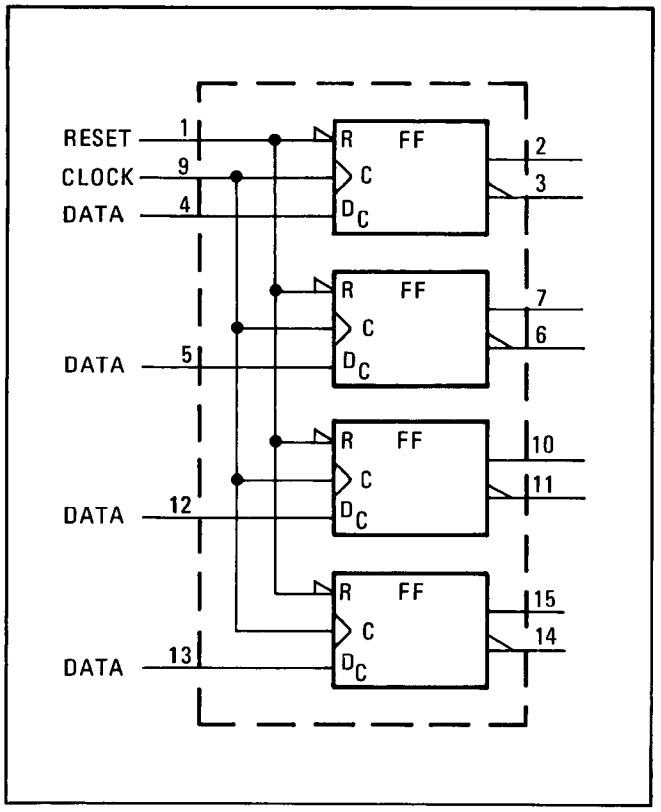


Figure 8-13. Quad D-Type Latch (Individual)

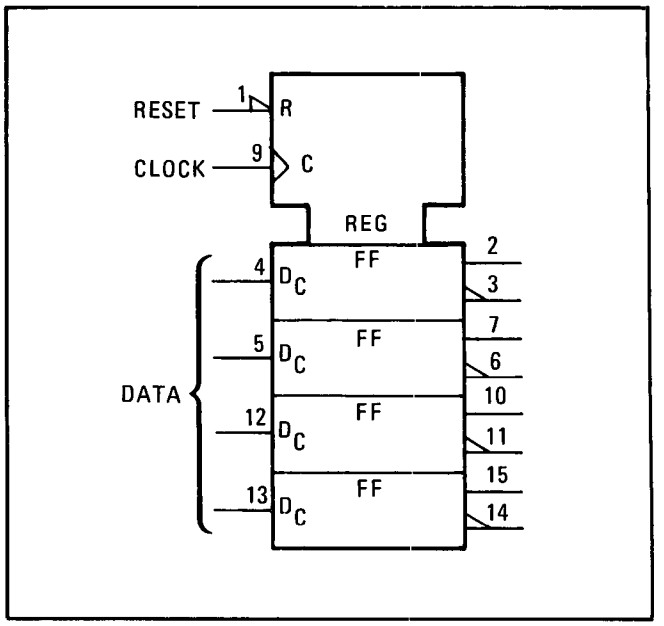


Figure 8-14. Quad D-Type Latch (Combined)

8-71. Complex Devices

Figures 8-15 through 8-17 show how the basic symbols can be combined in various ways to illustrate the behavior of fairly complex devices.

8-72. Quad D-Type Latch. Refer to Figure 8-15. The register control block is used to illustrate a quad D-type latch. There is a common active-low reset (R), and a common edge-triggered control input (C). Since there is only one dependency relationship, the controlling input is not numbered and the controlled function (D) is subscripted with a C.

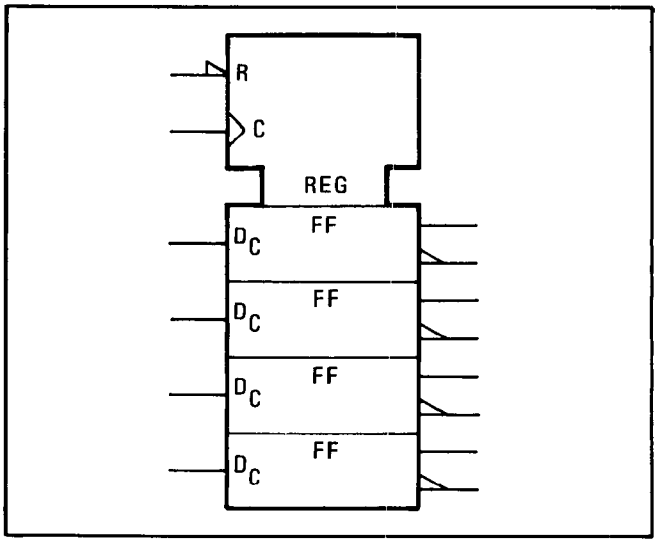


Figure 8-15. Quad D-Type Latch Example

Complex Devices (Cont'd)

8-73. Multiplexer. The multiplexer block is used to simplify the AND portion of a quad AND-OR select gate. When G1 is high, the data presented at the "1" inputs are gated through. When G2 is high, the data presented at the "2" inputs are gated through.

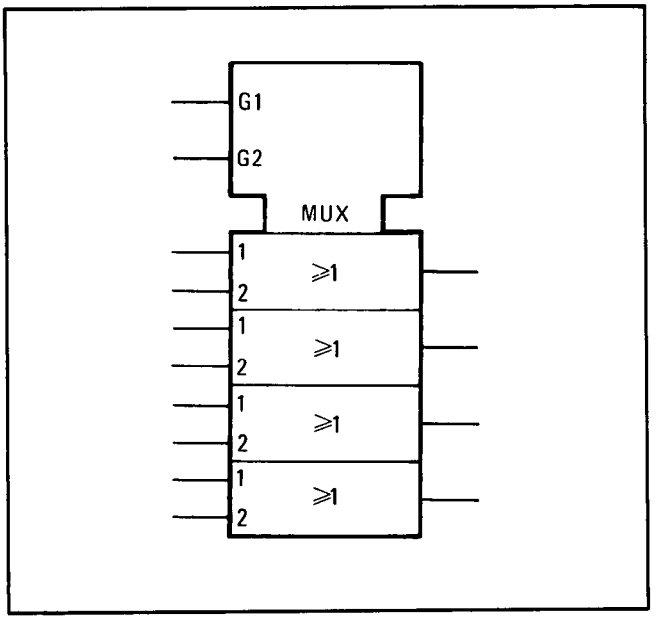


Figure 8-16. Multiplexer (AND-OR Selected) Example

8-74. Shift Register Control Block. The shift register control block is used to show common inputs to a bidirectional shift register. Notice that "→m" means shift the contents to the right or down by "m" units. And "←m" means shift the contents to the left or up by "m" units. Note: If m=1, "m" may be omitted. Inputs "a" and "b" are each single IC pins that have two functions. Input "a" enables one of the inputs to the top D-type flip flop (1D), and also shifts the register contents down one unit. Input "b" enables one of the inputs to the bottom flip-flop (2D), and also shifts the register contents up one unit. Input "c" loads all four flip-flops in parallel (3D). Input "d" is a common reset. The output delay indicator is used because the outputs change state when the control input returns to its inactive state.

8-75. Up-Down Counter Control Block. The counter control block (Figure 8-18) is used to show the common inputs to a Presettable Decade Up/Down Counter. Notice that "+m" means count up (increment the count) by "m"; "—m" means count down by "m". Note that if m=1, "m" may be omitted. Since the D-type flip-flops are master-slave, the output delay indicator is used. The "=9, +1" and "=0,—1" notation defines when the carry and borrow outputs are generated. They also define it as a decade counter; a binary counter would have carry indicated with "=15, +1". Flip-flop weighting is indicated in parenthesis.

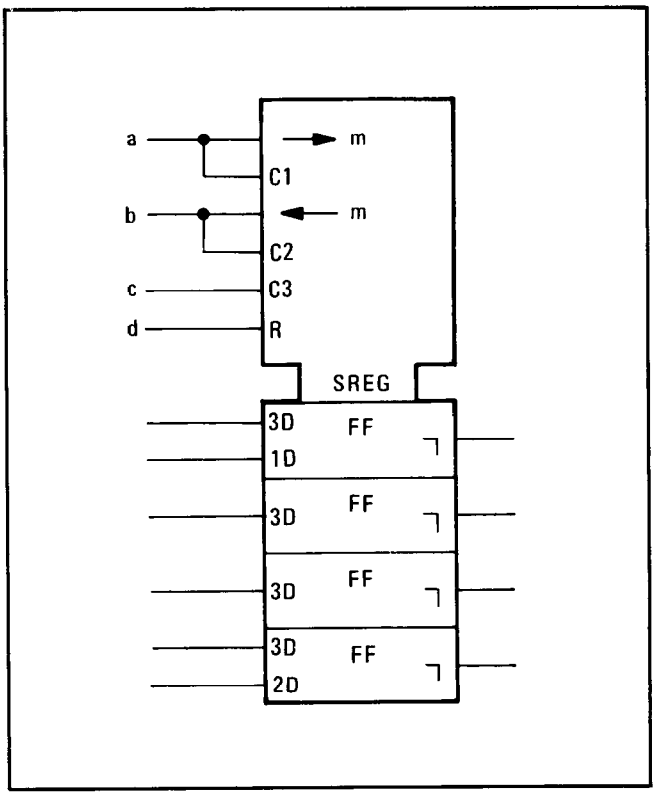


Figure 8-17. Shift Register Example

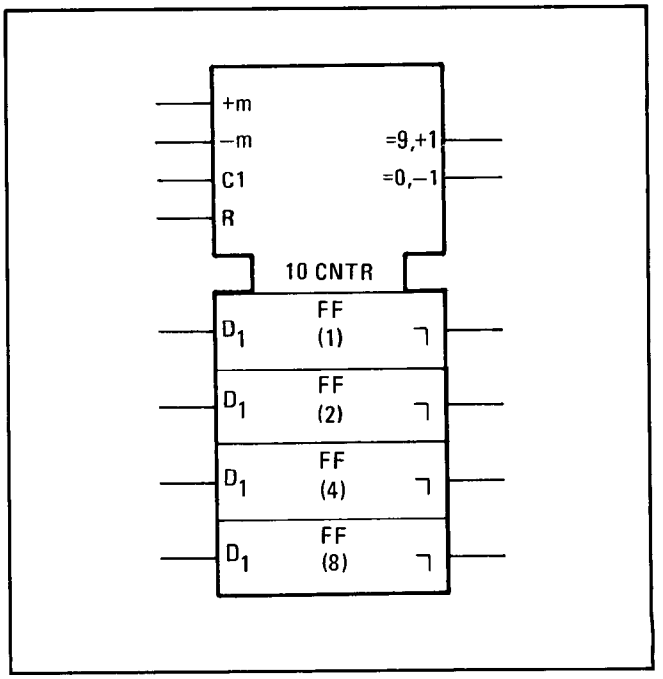


Figure 8-18. Up-Down Counter Example

Table 8-1. HP-IB Diagnostic Program (1 of 9)

```
10 REM 8672A HP-IB DIAGNOSTIC PROGRAM HEWLETT PACKARD 15 MAY 1980
20 REM NO EXTERNAL TEST EQUIPMENT REQUIRED.
30 FORMAT 6B
40 FORMAT F1000.0
50 REM SEARCH FOR 8672 TALK ADDRESS
60 OUTPUT (13,30)1024;
70 T=64
80 OUTPUT (13,30)256,T,53,512;
90 IF (STAT13=1) OR (STAT13=3) THEN 160
100 T=T+1
110 IF T=85 THEN 100
120 IF T >= 95 THEN 140
130 GOTO 80
140 PRINT "TALK ADDRESS INOPERATIVE.  PROGRAM SUSPENDED"
150 GOTO 4430
160 OUTPUT (15,30)"TALK ADDRESS= ",T
170 REM CHECK UNTALK FOR OTA
180 FOR T1=64 TO 95
190 IF T1=85 THEN 290
200 IF T1=T THEN 290
210 OUTPUT (13,30)256,T,53,512;
220 IF (STAT13=1) OR (STAT13=3) THEN 250
230 E=1
240 GOSUB 4170
250 OUTPUT (13,30)256,T1,512;
260 IF (STAT13=0) OR (STAT13=2) THEN 290
270 E=2
280 GOSUB 4170
290 NEXT T1
300 REM FIND LISTEN ADDRESS AND VERIFY UNTALK FOR LISTEN
310 L=T-32
320 OUTPUT (13,30)256,T,L,512;
330 IF (STAT13=0) OR (STAT13=2) THEN 360
340 PRINT " FAILURE TO LISTEN"
350 GOTO 4430
360 OUTPUT (15,30)"LISTEN ADDRESS= ",L
370 OUTPUT (13,30)256,T,512;
380 IF (STAT13=1) OR (STAT13=3) THEN 410
390 E=1
400 GOSUB 4170
410 FOR L1=32 TO 62
420 IF L1=L THEN 440
430 OUTPUT (13,30)256,T,L1,512;
440 IF (STAT13=1) OR (STAT13=3) THEN 470
450 E=1
460 GOSUB 4170
470 NEXT L1
480 PRINT "8672A RESPONDS OK TO TALK AND LISTEN ADDRESSES"LIN1
490 REM CHECK INITIAL CONDITION OF SRQ
500 IF (STAT13=2) OR (STAT13=3) THEN 530
510 E=5
520 GOSUB 4170
530 GOSUB 4370
```

Table 8-1. HP-IB Diagnostic Program (2 of 9)

```
540 IF S=0 THEN 570
550 GOSUB 3840
560 GOSUB 4140
570 OUTPUT (13,30)768;
580 GOSUB 4340
590 DISP "FREQUENCY DISPLAY SCAN"
600 WAIT 1300
610 GOSUB 4340
620 CMD "","@0D0Z0"
630 DISP "    0000"
640 WAIT 700
650 CMD "","G1248"
660 DISP "    0001"
670 WAIT 700
680 CMD "","F12Z2"
690 DISP "    0012"
700 WAIT 700
710 CMD "","E124J1"
720 DISP "    0124"
730 WAIT 700
740 CMD "","D1248Z4"
750 DISP "   1248"
760 WAIT 700
770 CMD "","C1248Z6"
780 DISP "   12480"
790 WAIT 700
800 CMD "","B1248Z1"
810 DISP "  124800"
820 WAIT 700
830 CMD "","A1248Z1"
840 DISP " 1248000"
850 WAIT 700
860 CMD "","@12480Z0"
870 DISP "12480000"
880 WAIT 700
890 CMD "","@248Z1"
900 DISP "24800000"
910 WAIT 700
920 CMD "","@48Z1"
930 DISP "48000000"
940 WAIT 700
950 CMD "","P8Z8"
960 DISP "80000000"
970 WAIT 700
980 PRINT "FREQUENCY SCAN COMPLETE"
990 DISP "REPEAT? 1 OR 0";
1000 INPUT A
1010 IF A#0 THEN 610
1020 CMD "","A4Z1"
1030 REM RF UNIT SCAN
1040 GOSUB 4340
1050 CMD "","A2000Z1"
```

Table 8-1. HP-IB Diagnostic Program (3 of 9)

```
1060 DISP "RF SEC. TESTS"
1070 WAIT 1500
1080 CMD "","00"
1090 DISP "RF OFF"
1100 WAIT 1500
1110 IF STAT13=2 THEN 1140
1120 E=5
1130 GOSUB 4170
1140 GOSUB 4370
1150 IF S=28 THEN 1180
1160 GOSUB 3840
1170 GOSUB 4140
1180 GOSUB 4340
1190 CMD "","01"
1200 DISP "RF ON"
1210 WAIT 1500
1220 IF STAT13=2 THEN 1250
1230 E=5
1240 GOSUB 4170
1250 GOSUB 4370
1260 IF S=0 THEN 1290
1270 GOSUB 3840
1280 GOSUB 4140
1290 GOSUB 4340
1300 FOR B=0 TO 11
1310 OUTPUT (13,30)"K",B+48;
1320 DISP "RANGE = ";-(B*10)
1330 WAIT 1000
1340 NEXT B
1350 CMD "","03"
1360 FOR B=0 TO 9
1370 OUTPUT (13,40)"K",B;
1380 DISP "RANGE = ";20-(B+1)*10
1390 WAIT 1000
1400 NEXT B
1410 CMD "","01"
1420 FOR B=0 TO 13
1430 OUTPUT (13,30)"_",B+48;
1440 DISP "VERNIER = "3-B
1450 WAIT 1000
1460 NEXT B
1470 CMD "","M3"
1480 DISP "AM 30%"
1490 WAIT 1200
1500 CMD "","M2"
1510 DISP "AM 100%"
1520 WAIT 1200
1530 CMD "","M0"
1540 DISP "AM OFF"
1550 WAIT 1200
1560 FOR I=0 TO 5
1570 OUTPUT (13,40)"N",I;
```

Table 8-1. HP-IB Diagnostic Program (4 of 9)

```
1580 D=(1+2*I-4*INT(I/2))*10↑(1-INT((I+1)/2))
1590 DISP "FM = ";D;"MHZ"
1600 WAIT 1200
1610 NEXT I
1620 CMD "","N7"
1630 DISP "FM OFF"
1640 WAIT 1500
1650 CMD "","05"
1660 DISP "EXT XTAL ALC"
1670 WAIT 1500
1680 CMD "","0="
1690 DISP "EXT PWR MTR ALC"
1700 WAIT 1500
1710 CMD "","01"
1720 DISP "INT ALC"
1730 WAIT 1500
1740 PRINT "RF CONTROL TESTS COMPLETE"LIN1
1750 DISP "REPEAT RF SECTION TESTS? 0 OR 1";
1760 INPUT A
1770 IF A#0 THEN 1070
1780 REM BUS COMMAND TESTS
1790 REM CHECK SRQ FALSE BEFORE PROCEEDING
1800 OUTPUT (13,30)256,63,95,512;
1810 IF STAT13=2 THEN 1840
1820 E=5
1830 GOSUB 4170
1840 REM CHECK RESPONSE TO BAD FREQUENCY
1850 GOSUB 4340
1860 CMD "","@8672Z1"
1870 GOSUB 4370
1880 IF BIAND(S,32)=32 THEN 1910
1890 E=6
1900 GOSUB 4170
1910 GOSUB 4340
1920 WAIT 100
1930 IF STAT13=0 THEN 2010
1940 IF STAT13=1 THEN 1980
1950 E=4
1960 GOSUB 4170
1970 GOTO 2010
1980 E=2
1990 GOSUB 4170
2000 REM CHECK SPE
2010 OUTPUT (13,30)256,24,512;
2020 IF STAT13=0 THEN 2100
2030 REM AND CHECK FOR NO RESPONSE
2040 IF STAT13=1 THEN 2080
2050 E=4
2060 GOSUB 4170
2070 GOTO 2100
2080 E=2
2090 GOSUB 4170
```

Table 8-1. HP-IB Diagnostic Program (5 of 9)

```
2100 GOSUB 4370
2110 GOSUB 3840
2120 IF S6=1 THEN 2150
2130 E=6
2140 GOSUB 4170
2150 IF S7=1 THEN 2190
2160 E=7
2170 GOSUB 4170
2180 REM SRQ SHOULD=0 AFTER SERIAL POLL
2190 IF STAT13=3 THEN 2270
2200 IF STAT13<2 THEN 2240
2210 E=2
2220 GOSUB 4170
2230 GOTO 2270
2240 E=5
2250 GOSUB 4170
2260 REM CHECK SPD
2270 OUTPUT (13,30)256,25,512;
2280 IF STAT13=3 THEN 2350
2290 IF STAT13<2 THEN 2330
2300 E=1
2310 GOSUB 4170
2320 GOTO 2350
2330 E=5
2340 GOSUB 4170
2350 S=RBYTE13
2360 REM 8672 SHOULD STILL HAVE INVALID FREQUENCY,RSV
2370 IF S>95 THEN 2420
2380 E=7
2390 GOSUB 4170
2400 GOSUB 3840
2410 GOSUB 4140
2420 GOSUB 4340
2430 REM SEND GOOD THEN BAD FREQUENCY - SRQ SHOULD RETURN
2440 CMD "","A4Z1"
2450 CMD "","P8672Z1"
2460 WAIT 40
2470 CMD "","P8672Z1"
2480 WAIT 100
2490 IF STAT13=0 THEN 2530
2500 E=4
2510 GOSUB 4170
2520 REM CHECK SDC
2530 OUTPUT (13,30)256,4,512;
2540 PRINT "SELECTED DEVICE CLEAR (SDC) TESTED"
2550 IF STAT13=2 THEN 2580
2560 E=5
2570 GOSUB 4170
2580 GOSUB 4370
2590 IF S=28 THEN 2620
2600 GOSUB 3840
2610 GOSUB 4140
```

Table 8-1. HP-IB Diagnostic Program (6 of 9)

```
2620 GOSUB 4340
2630 CMD "","@8672Z1","?U","A4Z1"
2640 REM CHECK NO RESPONSE AFTER UNLISTEN
2650 WAIT 100
2660 IF STAT13=0 THEN 2690
2670 PRINT "RESPONSE WHEN NOT ADDRESSED"
2680 GOSUB 4300
2690 OUTPUT (13,30)256,4,512;
2700 WAIT 100
2710 IF STAT13=0 THEN 2750
2720 PRINT "RESPONSE TO SDC WHEN NOT ADDRESSED"
2730 GOSUB 4300
2740 REM CHECK DCL
2750 OUTPUT (13,30)256,20,512;
2760 PRINT "DEVICE CLEAR (DCL) TESTED"
2770 IF STAT13=2 THEN 2810
2780 GOSUB 4370
2790 GOSUB 3840
2800 GOSUB 4140
2810 GOSUB 4340
2820 REM CHECK GTL
2830 OUTPUT (13,30)256,1,512;
2840 CMD "","@8672Z1"
2850 WAIT 100
2860 IF STAT13=2 THEN 2890
2870 PRINT "PROGRAMMED FREQUENCY IN LOCAL"
2880 GOSUB 4300
2890 GOSUB 4340
2900 CMD "","@8672Z1"
2910 WAIT 100
2920 IF STAT13=0 THEN 2950
2930 E=6
2940 GOSUB 4170
2950 OUTPUT (13,30)256,4,512;
2960 REM CHECK REN
2970 OUTPUT (13,30)1024;
2980 GOSUB 4340
2990 CMD "","@8672Z1"
3000 WAIT 100
3010 IF STAT13=2 THEN 3040
3020 PRINT "PROGRAMMED FREQUENCY WITH REN FALSE"
3030 GOSUB 4300
3040 OUTPUT (13,30)768;
3050 GOSUB 4340
3060 CMD "","@8672Z1"
3070 WAIT 100
3080 IF STAT13=0 THEN 3110
3090 E=6
3100 GOSUB 4170
3110 OUTPUT (13,30)256,20,512;
3120 GOSUB 4340
3130 REM CHECK FOR NO RESPONSE TO UNDEFINED CHARACTERS"
```

Table 8-1. HP-IB Diagnostic Program (7 of 9)

```
3140 CMD "","@8672Z"
3150 FOR X=0 TO 47
3160 GOSUB 3250
3170 NEXT X
3180 GOSUB 3810
3190 FOR X=96 TO 127
3200 GOSUB 3250
3210 NEXT X
3220 GOSUB 3810
3230 GOTO 3370
3240 REM ROUTINE TO OUTPUT UNDEFINED CHARACTERS
3250 OUTPUT (13,30)X
3260 WAIT 100
3270 IF STAT13=2 THEN 3350
3280 PRINT "RESPONSE TO CHARACTER ",X
3290 GOSUB 4300
3300 GOSUB 4370
3310 GOSUB 3840
3320 GOSUB 4140
3330 GOSUB 4340
3340 CMD "","@8672Z"
3350 RETURN
3360 REM FINISH TEST FOR UNDEFINED CHARACTERS
3370 CMD "","0"
3380 WAIT 100
3390 IF STAT13=0 THEN 3420
3400 PRINT "INVALID CHARACTER UPSET I/A REGISTER"LIN1
3410 GOSUB 4300
3420 OUTPUT (13,30)256,4,512;
3430 PRINT "INSTRUMENT DID NOT RESPOND TO INVALID INPUTS"
3440 REM CHECK FREQUENCY LIMITS
3450 PRINT "FREQUENCY LIMITS CHECKED NOW"LIN1
3460 A=1
3470 GOSUB 4340
3480 FOR F=0 TO 999 STEP 2
3490 GOSUB 3690
3500 IF (STAT13=2) OR (STAT13=3) THEN 3540
3510 GOSUB 4370
3520 GOSUB 4340
3530 IF S >= 96 THEN 3560
3540 S6=0
3550 GOTO 3570
3560 S6=1
3570 IF A=S6 THEN 3650
3580 A=S6
3590 IF S6=1 THEN 3630
3600 F1=F
3610 PRINT "LOWER LIMIT = ";F1/10;"GHZ"LIN1
3620 GOTO 3650
3630 F9=F
3640 PRINT "UPPER LIMIT = ";F9/10;"GHZ"LIN1
3650 NEXT F
```

Table 8-1. HP-IB Diagnostic Program (8 of 9)

```
3660 F=F1
3670 GOSUB 3690
3680 GOTO 3770
3690 OUTPUT (13,30)64
3700 IF F>99 THEN 3740
3710 OUTPUT (13,30)48
3720 IF F>9 THEN 3740
3730 OUTPUT (13,30)48
3740 OUTPUT (13,40)F;"Z1"
3750 WAIT 100
3760 RETURN
3770 CMD "","D020"
3780 OUTPUT (13,30)256,L,1,63,512;
3790 PRINT "DONE"LIN2
3800 GOTO 4430
3810 REM SUBROUTINES*******
3820 DISP "CHECKING INVALID CHARACTERS"
3830 RETURN
3840 REM STATUS BYTE DECODING SUBROUTINE
3850 S2=S3=S4=S5=S6=S7=S8=0
3860 S1=S
3870 IF S1<128 THEN 3900
3880 S8=1
3890 S1=S1-128
3900 IF S1<64 THEN 3930
3910 S7=1
3920 S1=S1-64
3930 IF S1<32 THEN 3960
3940 S6=1
3950 S1=S1-32
3960 IF S1<16 THEN 3990
3970 S5=1
3980 S1=S1-16
3990 IF S1<8 THEN 4020
4000 S4=1
4010 S1=S1-8
4020 IF S1<4 THEN 4050
4030 S3=1
4040 S1=S1-4
4050 IF S1<2 THEN 4080
4060 S2=1
4070 S1=S1-2
4080 IF  NOT (S6 OR ( NOT S5 AND (S1 OR S3 OR S4))) THEN 4130
4090 IF S7=1 THEN 4130
4100 GOSUB 4140
4110 E=7
4120 GOSUB 4170
4130 RETURN
4140 PRINT " S    OVN   RSV  ERRS  RFOFF  UNLK  UNLVL FMOM  OVRRNG"
4150 PRINT S;S8;S7;S6;S5;S4;S3;S2;S1
4160 RETURN
4170 REM SUBROUTINE TO PRINT ERROR MESSAGES
```

Table 8-1. HP-IB Diagnostic Program (9 of 9)

```
4180 GOTO E OF 4190,4210,4300,4230,4250,4270,4290
4190 PRINT "8672 FAILED TO TALK WHEN ADDRESSED"
4200 GOTO 4300
4210 PRINT "8672 TALKED WHEN NOT ADDRESSED"
4220 GOTO 4300
4230 PRINT "DID NOT GET EXPECTED SRQ"
4240 GOTO 4300
4250 PRINT "UNEXPECTED  SRQ"
4260 GOTO 4300
4270 PRINT "ERROR IN FREQUENCY PROGRAMMING OR FREQ STATUS BIT"
4280 GOTO 4300
4290 PRINT "ERROR IN ENCODING RSV"
4300 DISP "PRESS CONT EXECUTE TO CONTINUE"
4310 STOP
4320 RETURN
4330 REM SUBROUTINE TO ADDRESS 8672 AS LISTENER
4340 OUTPUT (13,30)256,63,85,L,512;
4350 RETURN
4360 REM SUBROUTINE TO ADDRESS 8672 AS TALKER AND CHECK FOR
     BYTE RECEIVED
4370 OUTPUT (13,30)256,53,T,512;
4380 IF (STAT13=1) OR (STAT13=3) THEN 4410
4390 E=1
4400 GOSUB 4170
4410 S=RBYTE13
4420 RETURN
4430 END
```

Assemblies vs. Service Sheet List

Assembly	Description	Ser. Sheets	
A1A1	Bd Assembly, RF Output Front Panel	20	7-A1
A1A2	Display Driver Assembly	20	7-A1
A1A3	YTM Assembly	15	2-A1
A1A5	Assembly, ALC	14	1-A1
A1A6	Board Assembly, Detector	17	4-A1
A1A7	Assembly, SRD Bias	16	3-A1
A1A8	Assembly, YTM Driver	15	2-A1
A1A9	Metering Assy	21	8-A1
A1A10	Assembly, Level Control	18	5-A1
A1A11	Digital Processor Assembly	19	6-A1
A1A12	Power Amplifier Assembly	15	2-A1
A1A13	Interconnect Assembly	14,15,22	1-A1, 2-A1
A1A14	A1 Mother Board	14-20	1 to 8-A1
A2A1	Assembly, DCU Front Panel	31,32	12-A2, 13-A2
A2A2	Rotary Pulse Generator	20	13-A2
A2A3	Assembly, VCO, 160-240 MHZ	8	3-A2
A2A4	Assembly, 20/30 Phase Detector	7	2-A2
A2A5	Assembly, 20/30 Divider	6	1-A2
A2A6	Assembly, Interconnect Adapter		
A2A7	Assembly, Interface	24,25	5-A2, 6-A2
A2A8	Assembly, Output Register	29,30	10-A2, 11-A2
A2A9	Assembly, HP-IB Address	22,23	4-A2
A2A10	Assembly, Register I	26	7-A2
A2A11	Assembly, Timing Control	27,28	8-A2, 9-A2
A2A12	A2 Mother Board	6-8,22-32	4 to 11-A2
A3A1A1	Reference Phase Detector Assembly	1	1-A3
A3A1A2	100 MHz VCXO Assembly	2	2-A3
A3A1A3	M/N Phase Detector Assembly	3	3-A3
A3A1A4	M/N VCO Assembly	4	4-A3
A3A1A4A1	VCO Resonator Assembly	4	4-A3
A3A1A4A2	Board Assembly, M/N VCO	4	4-A3
A3A1A5	M/N Output Assembly	5	5-A3
A3A1A6	Mother Board, Reference	1-3,5	1, 3, and 5-A3
A3A2	Rectifier Assembly	33	11-A3
A3A3	Positive Regulator Assembly	34	12-A3
A3A4	Negative Regulator Assembly	35	13-A3
A3A5	Digital-to-Analog Converter Assembly	9	6-A3
A3A6	YTO Main Coil Driver Assembly	10	7-A3
A3A7	YTO HF Coil Driver Assembly	13	10-A3
A3A8	10 MHZ Reference Oscillator	1	1-A3
A3A9	YTO Loop Assembly	11,12	8-A3, 9-A3
A3A9A1	Directional Coupler Assembly	13	10-A3
A3A9A2	YTO Interconnect Assembly	11-13	8, 9, and 10-A3
A3A9A3	2.0 - 6.6 GHZ YTO Assembly	13	10-A3
A3A9A4	YTO Phase Detector Assembly	12	9-A3
A3A9A5	Assembly, Sampler	11	8-A3
A3A9A7	6.2 GHZ Low Pass Filter	13	10-A3
A3A10	Mother Board	1,3,4,6,10, 13,25,30-35	1 to 13-A3

SERVICE SHEET 1

PRINCIPLES OF OPERATION

The HP Model 8672A Synthesized Signal Generator consists of the A3 RF Source Assembly, A2 Controller Assembly and the A1 RF Output Assembly. Figure 8-19 is a simplified block diagram. The Overall Troubleshooting Block Diagram shows the interconnections between the major assemblies. Figure 8-20 shows the physical location of these assemblies in the Synthesizer.

The Synthesizer's RF output signal is generated in the YTO Loop of the A3 RF Source Assembly. Through the interconnection of the phase lock loops, the output signal is phase locked to the time base. The power supplies are also part of the A3 Assembly.

Digital signals from the A2 Controller Assembly are input to the loop circuits to control the RF output frequency. The frequency may be tuned from the front panel or programmed through the HP-IB Interface. The RF signal from the YTO is passed through an amplifier, PIN modulator, YIG-tuned-multiplier, and stepped attenuator in the A1 RF Output Assembly. An ALC loop controls the level and provides amplitude modulation. The attenuator's output is connected to the front panel RF Output jack. The frequency and amplitude modulation modes are selected by circuits within the A1 Assembly. The FM is added to the carrier in the A3 Assembly's YTO Loop.

In the local mode, the control signals are input from the front panel. Programmed inputs come through the HP-IB Interface to control frequency, RF level functions, and modulation.

The front panel annunciators indicate the Synthesizer's operating mode and status. Table 8-2 lists the status and explains the functions monitored.

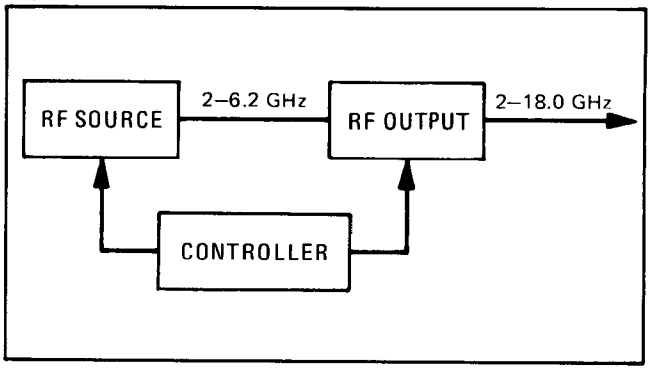


Figure 8-19. Synthesizer's Simplified Block Diagram

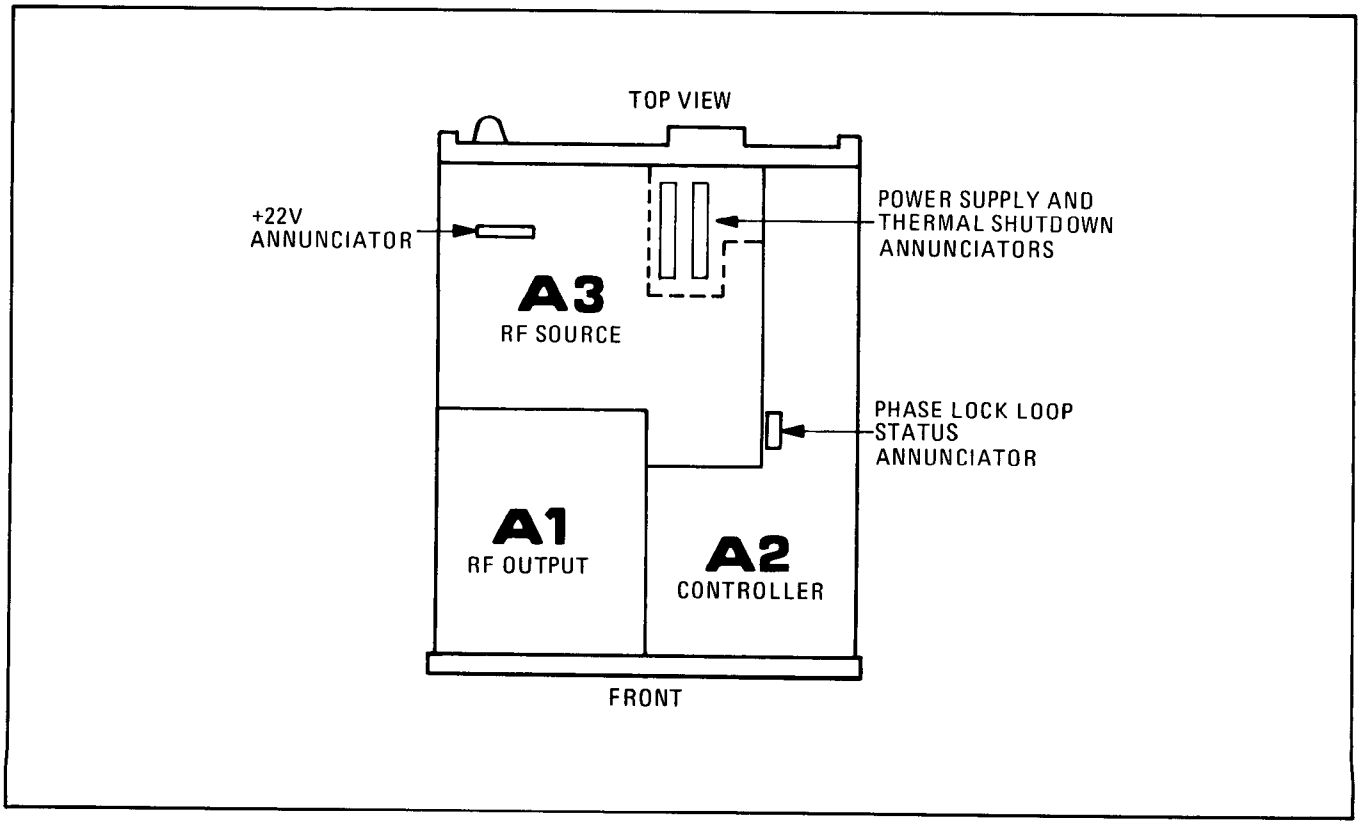


Figure 8-20. Major Assembly Locations

Table 8-2. Front Panel Status Annunciators

Annunciator		Purpose
Name	Location	
OVEN	A2	Monitors the reference oven in the A3 Assembly. Indicates oven temperature is not stabilized.
OUT OF RANGE	A2	Indicates that an incorrect frequency has been programmed.
REMOTE	A2	Indicates that the Synthesizer is in the remote mode.
STANDBY	A2	Indicates that the LINE switch is set to STANDBY.
NOT PHASE-LOCKED	A2	Indicates that one or more of the loops are not phase-locked. Refer to the Phase Lock Loop Status Annunciators.
INT REFERENCE OFF	A2	Indicates that the rear panel FREQ REF switch is set to EXT.
FM OVER MOD	A1	Indicates that the maximum FM deviation (A3) or maximum input drive (A1) has been exceeded.
ALC LEV UNCAL	A1	Indicates that the ALC (leveling) circuit is not providing a leveled output or that the range attenuator was programmed to a power level below its range.

TROUBLESHOOTING

Begin troubleshooting by following Table 8-3, Overall Troubleshooting. The table is designed to isolate a malfunction to one of the three major assemblies. Begin troubleshooting with step 1. This is important since the table assumes that all measurements and indications are normal. When a malfunction is isolated by using the table, turn to the service sheet indicated for further troubleshooting information.

The following information can also be used to isolate a malfunction to the major assembly level or it can be used as supplemental information to the table.

Refer to Overall Troubleshooting Block Diagram. Examine the front and rear panel switches and annunciators or program specific functions and examine their annunciators. A switch or programmed function normally will effect only one annunciator. Some will also change the status annunciators listed in the Front Panel Status Annunciators' table. Check to see that those related to the malfunction respond properly to the switch setting or programmed function. For detailed information on the annunciator response to switch settings, refer to the figures showing the front and rear panel controls, connectors and indicators in Section III.

Problems indicated by the NOT PHASE LOCKED annunciator can be further isolated by removing the instrument's top cover. (Refer to the Disassembly and Reassembly procedures in this section.) View the phase-locked loop annunciators which are located on the A2 assembly (refer to Figure 8-19). If the entire instrument seems to be off or if the STANDBY annunciator does not change with the LINE switch being set to ON, check the rear panel fuse and the power supply and thermal shutdown annunciators. Also check the +22V annunciator.

The next step is to measure main signal paths that lead to a malfunction in one of the major assemblies. Refer to the Overall Troubleshooting Block Diagram. When a problem is isolated to a major assembly, refer to the troubleshooting information on the appropriate service sheet.

The following table is designed to isolate a malfunction to one of three major assemblies. Begin troubleshooting with step 1. This is important, since the table is set up assuming that all previous steps are normal. When a malfunction is located in the table, turn to the service sheet indicated for further troubleshooting information.

Table 8-3. Overall Troubleshooting (1 of 3)

INITIAL CONDITIONS

1. Check that the LINE switch is in STANDBY and remove the Power Cable from the Line Module (A3A11).
2. Set the voltage selection card in the Line Module (A3A11) for the nominal line voltage to be used.
3. Check that the Line Fuse (A3F1) is the correct value and type.

NOTE

Remove the HP-IB Connector Plug, if connected.

4. Check that the LINE switch is in STANDBY and insert the Power Cable into the Line Module.
5. Set the rear panel controls and cables as follows:
   a. FREQ STANDARD INT/EXT switch to INT.
   b. Jumper (A3W3) connecting A3J9 to A3J10.
6. Set the front panel controls and switches as follows:
   a. METER MODE to LEVEL
   b. RF selector to ON.
   c. OUTPUT LEVEL RANGE control to one step from fully clockwise (0 dBm).
   d. OUTPUT LEVEL VERNIER control to fully clockwise (+3 dB).
   e. ALC selector to INT.
   f. AM selector to OFF.
   g. FM selector to OFF.

	Test	Results	If Faulty Go To
1.	Set LINE switch to STANDBY position.	OVEN and STANDBY annunciators light.	Continue to step 2
2.	Set line switch to ON position.	00 dBm Range displayed. Meter indicates full scale. ALC annunciator INT lights. RF annunciator ON lights. NOT PHASE LOCKED annunciator may light momentarily and then extinguish. Frequency within specified range[1].	SS4 SS4 SS4 SS4 SS3 SS3
3.	Press PRESET pushbutton.	Frequency goes to 3000.000 MHz.	SS3
4.	Press FREQUENCY RESOLUTION pushbutton on the left to produce 100 MHz resolution.	Light Bar for 100 MHz resolution lights.	SS3
5.	Turn TUNING control first clockwise then counterclockwise.	Frequency increases and then decreases in 100 MHz steps.	SS3
6.	Press FREQUENCY RESOLUTION pushbutton next to the left to produce 1 MHz resolution and turn the TUNING control clockwise and then counterclockwise.	Light Bars for 100 and 1 MHz resolution light and frequency increases and decreases in 1 MHz steps.	SS3
7.	Press the next FREQUENCY RESOLUTION pushbutton to produce 10 kHz resolution and turn the TUNING control clockwise and then counterclockwise.	Light Bars for 100 and 1 MHz and 10 kHz resolution light; the frequency increases and decreases in 10 kHz steps.	SS3

[1] The Synthesizer will produce the last frequency entered. If the Synthesizer was remotely programmed to an out-of-range frequency, when power is applied and the Synthesizer is in local, it will count up or down until a legal frequency is reached. This action can be terminated by pressing the PRESET pushbutton. A dead battery can produce similar results when first applying power.

Table 8-3. Overall Troubleshooting (2 of 3)

Test	Results	If Faulty Go To
8. Press the last FREQUENCY RESOLUTION pushbutton to produce 1 kHz resolution[1] and turn the TUNING control cw, then ccw.	Light Bars for 100 and 1 MHz, 10 and 1 kHz light and frequency increases and decreases in 1 kHz steps.[1]	SS3
9. Press the HOLD pushbutton.	All Light Bars extinguish.	SS3
10. Turn the TUNING control cw and then ccw.	Frequency does not change.	SS3
11. Press the PRESET pushbutton.	Frequency goes to 3000.000 MHz.	SS3
SETUP Connect spectrum analyzer to RF OUTPUT connector and adjust to observe a 3 GHz signal. Use 50 dB input attenuation, 2 kHz scan width, 0.3 kHz bandwidth, 50 milliseconds scan time, and +10 dBm log reference level.		
12. Set OUTPUT LEVEL RANGE control to +10 dBm and VERNIER control to approximately 0 dB.	Signal displayed on Spectrum Analyzer approaches top graticule line. LEV UNCAL annunciator may light.	Continue to step 13
13. Turn OUTPUT LEVEL RANGE control counterclockwise to −100 dBm.	Signal drops in 10 dB steps.	SS4
14. Set OUTPUT LEVEL RANGE to −20 dBm. Then set the RF switch to OFF position.	Power level drops to zero.	SS4
15. Set RF switch to ON and apply a 1 kHz signal at 600 ohms impedance to AM INPUT connector. Set METER MODE selector to AM and AM selector to 30% position. Adjust modulation signal level for full scale Meter indication.	Spectrum Analyzer displays sidebands approximately 16.5 dB below carrier.	SS4
16. Set AM selector to 100% position and adjust modulation signal level for half scale indication on Meter.	Sidebands approximately 12 dB below carrier.	SS4
17. Set AM selector to OFF and METER MODE selector to FM position. Apply modulating signal at 50 ohms impedance to FM INPUT connector. Adjust modulation level to null the carrier for the following deviation ranges.		

FM Deviation Selector	Modulation Frequency	Meter Indication
0.03 MHz	10 kHz	24 ± 1.5 kHz
0.1 MHz	37.5 kHz	90 ± 5 kHz
0.3 MHz	125 kHz	300 ± 15 kHz
1 MHz	125 kHz	300 ± 50 kHz
3 MHz	1 MHz	2.4 MHz ± 150 kHz
10 MHz	3 MHz	7.2 MHz ± 500 kHz

[1] Frequency resolution varies with frequency band selected: 1 kHz for 2.0 to 6.2 GHz, 2 kHz for 6.2 to 12.4 GHz, and 3 kHz for 12.4 to 18.0 GHz.

OVER

SIZE

PLEASE INSERT

MANUAL IDENTIFICATION

Model Number: 8672A Opt.008
Date Printed: December 1983
Part Number: 08672-90104

SYNTHESIZED SIGNAL GENERATOR

This supplement contains important information for correcting manual errors and for adapting the manual to instruments containing improvements made after the printing of the manual.

To use this supplement:

Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes
1906A-2348A	1
2352A, 2426A	1, 2
2429A, 2449A	1–3
2515A	1–3

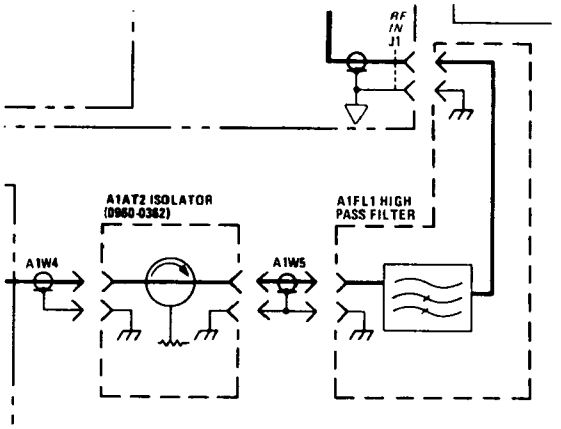
Serial Prefix or Number	Make Manual Changes

► NEW ITEM

ERRATA

Page 6-3, Table 6-1:
A1A5C25, Q7: If these parts need replacement, use the parts shown in **CHANGE 3.**

Page 8-43, Service Sheet 1-A1 (schematic):
Change FQ to FG (upper left part of schematic).
On A1A13 Interconnect Assembly, change pin numbers as follows:
41 to 47, and 47 to 41.
11 to 10, and 10 to 11.
Remove "NSR" from A1A13A1.
Replace the corresponding part of the schematic with the figure below.



NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

HEWLETT PACKARD

CHANGE 1

Page 6-3, Table 6-1:
Delete capacitor A1A5C29.

Page 8-3, Service Sheet 1-A1:
Delete capacitor C29, between U4 and U5.

CHANGE 2

Page 6-2, Table 6-1:
Add A1A2C1 0160-4835 CD7 CAPACITOR-FXD .1 μF 50 VDC CER.

CHANGE 3

Page 6-3, Table 6-1:
Change A1A5C25 to 0140-0192 CD9 CAPACITOR-FXD 68 PF ±5% 300 VDC MICA.
Change A1A5Q7 to 1854-0712 CD3 TRANSISTOR DUAL NPN PD = 1.8W.

Page 8-3, Service Sheet 1-A1:
Change C25 to 68 pF.
In the table of transistor part numbers, change Q7 to 1854-0712.

MANUAL CHANGES

SERVICE ENG

SYNTHESIZED SIGNAL GENERATOR

MANUAL IDENTIFICATION

Model Number: ~~HP 8672A~~
Date Printed: March 1983
Part Number: ~~08672-90086~~

ABOUT THIS SUPPLEMENT

Use this supplement to correct your manual or to update it for instrument changes that occurred after the manual was printed.

Some material in this supplement should be substituted for material in the manual. You can either perform the physical substitution or simply mark your manual with reference to appropriate pages in the supplement.

Change instructions are arranged in the manual's page-number order. Then, each instruction is identified by the word "Errata" or with a change number. Errata changes relate to all instruments. Instructions with change numbers relate only to certain instruments. These instruments are identified by serial number or prefix in the following table.

-- This symbol identifies instructions that are appearing in the supplement for the first time.

Serial Prefix or Number	Make Manual Changes
2249A	1
2311A	1-2
2336A	1-3
2342A	1-4
2348A	1-5
2352A	1-6
2426A	1-7
2429A	1-8
2449A	1-9
2515A,2614A	1-10
2629A	1-11
2640A	1-12

Serial Prefix or Number	Make Manual Changes
2643A	1-13
2645A	1-14
2649A	1-15
2703A	1-16
2708A	1-17
2747A	1-18
# 2823A	1-19

CHANGE INSTRUCTIONS

Page 1-2, Table 1-1:

Add the following note at the beginning of the table:

"Specifications for output flatness, absolute level accuracy, and modulation apply only when internal leveling is used." *(Errata)*

Under FREQUENCY CHARACTERISTICS, change the first sentence in **Switching Time (CW and AM modes):** to read:"<20 ms to be within 1 kHz...". *(Change 16)*

NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

3 June 1988
22 Instruction Pages
32 Revised Material Pages
Printed in U.S.A.

HEWLETT PACKARD

CHANGE INSTRUCTIONS

Page 1-3, Table 1-1:

Under RF OUTPUT CHARACTERISTICS, change **Level** to "+8 to -120 dBm, +15 C to +35 C." *(Change 13)*

In the Indicated Meter Accuracy table, add a column for a +10 dBm RANGE switch setting. Insert the following information:

Frequency Range (GHz)	**+10 dB**
2.0-6.2	+/-1.75 dB
6.2-12.4	+/-2.0 dB
12.4-18.6	+/-2.25 dB

(Change 13)

Under the **Flatness** specification, add the following:

Flatness (+10 dBm range, +15 C to +35 C):

+/-0.75 dB, 2.0-6.2 GHz
+/- 1.00 dB, 2.0-12.4 GHz
+/- 1.25 dB, 2.0-18.0 GHz

(Change 13)

Change **Source SWR:** <2.5 to **Source SWR:** typically <2.5. *(Change 1)*

In footnote 11, change "specification" to "characteristic". *(Change 1)*

Page 1-4, Table 1-1:

Under **AMPLITUDE MODULATION CHARACTERISTICS**:

Change the title of **Depth** to:"**Depth (for vernier meter readings less than or equal to 0 dBm and power level settings less than or equal to 0 dBm, +15 C to +35 C):**" *(Change 13)*

Change the title of **Distortion** to "**Distortion (for rates less than or equal to 10 kHz and vernier meter readings less than or equal to 0 dBm and power level settings less than or equal to 0 dBm, +15 C to +35 C):**" *(Change 13)*

Page 1-5:

Under **REMOTE PROGRAMMING CHARACTERISTICS**, change **Output Level** to read: "Programmable in 1 dB steps, +8 to -120 dBm, plus 5 dB of overrange." *(Change 13)*

In paragraph 1-20, **DESCRIPTION**, change the second sentence to "The output is leveled and calibrated from +8 to -120 dBm." *(Change 13)*

CHANGE INSTRUCTIONS

Page 1-6:

Under Mechanical Options, Change the following parts to the metric parts listed:

Description	English Part No.	Metric Part No.
Chassis Slide Mount Kit	1494-0017	1494-0059
Slide Mount Adapter	1494-0023	1494-0061
Front Handle Kit Option	5061-0089	5061-9689
Rack Flange Kit	5061-0077	5061-9677
Rack Flange and Front Handle Combination Kit	5061-0083	5061-9683

(Change 10)

In the right-hand column, under paragraph 1-49 Chassis Slide Mount Kit, change the fifth sentence to read "If the instrument rack mounting slides are to be mounted in a non-HP rack...". *(Errata)*

Page 1-8, Table 1-2:

Add the following:

Instrument: Analyzer, Distortion
Critical Specifications: Measurement accuracy of <0.5% at 10 kHz.
Recommended Model: HP 334A
Use: P
(Change 13)

Page 3-2, Table 3-1:

In the left column, under RF annunciator, delete the description of OVERRANGE. *(Change 13)*

Page 3-6, Table 3-3:

Under step 6, change the third sentence to read: "In the +10 dBm range, the VERNIER's range is specified only to +8 dBm output level but some Synthesizers may deliver more power." Delete the fourth sentence.
(Change 13)

Page 3-7, Table 3-3:

Under step 11, change the last phrase in the second sentence to read: "the ALC Block annunciator LEV UNCAL should remain off."
(Change 13)

Page 3-17:

In paragraph 3-36, Programming ALC, add after the first paragraph: "Programming the higher power levels is accomplished by giving the range and ALC codes for the +10 dBm range plus the vernier code for -2 dB to reach +8 dBm." *(Change 13)*

Page 3-19:

In the STATUS BYTE table, delete OVERRANGE in Bit Number 1.
(Change 13)

Page 3-21, Table 3-10:

In the STATUS BYTE table, delete OVERRANGE in Bit Number 1.
(Change 13)

CHANGE INSTRUCTIONS

Page 4-2:

In step 2 of the procedure, change the second phrase of the second sentence to: "OUTPUT LEVEL RANGE to +10 dBm". *(Change 13)*

Figure 4-1: A new Figure is needed. Mark your manual with a reference to Revised Material for Page 4-2 in this change supplement. *(Change 13)*

Page 4-3:

In step 4, change the second sentence to read: "Adjust the VERNIER control to obtain a meter reading of +8 dBm."

In step 8, change the first phrase of the first sentence to read: "Set the OUTPUT LEVEL RANGE to 0 dBm." *(Change 13)*

Page 4-5, Test 4-12:

In step 6, change the first sentence to read "Tune the Synthesizer in 100 MHz steps over the frequency range." *(Change 13)*

After step 6, add the following steps:

7. Set the OUTPUT LEVEL RANGE switch to +10 dBm and the OUTPUT LEVEL VERNIER to -2 dB. This should yield a nominal output power of +8 dBm. Press the dB REL button to establish a new reference.

8. Again tune the Synthesizer from 2 to 18 GHz while observing and recording the maximum and minimum power variations observed. Be sure to change the power meter's calibration as the frequency is changed. Add the maximum variations together and divide by 2 to determine if the specifications have been met. *(Change 13)*

Change step 7 to step 9. *(Change 13)*

Pages 4-7 through 4-9:

Delete the SWR Performance Test, paragraph 4-14. *(Errata)*

Page 4-9, Step 7:

Change "power" to "voltage". *(Errata)*

Page 4-16:

Change step 2 to read: "Tune the Synthesizer to 3000 MHz at an OUTPUT LEVEL of 0 dBm." *(Change 13)*

Page 4-46, Table 4-4:

Delete paragraph 4-14, SWR, from the Performance Test Record. *(Change 1)*

CHANGE INSTRUCTIONS

Page 5-2, Table 5-1:
Delete references to A2A8C7. *(Change 1)*
Add the following:
Reference Designator: A3A1A5L2
Service Sheet: 5-A3
Range of Values: 39-68 nH
Basis of Selection: M/N Output Assembly. Selected to adjust the gain of the mixer amplifier to eliminate spurious signals at a 9 and 10 kHz offset from the fundamental signal.
(Change 12)
Add the following:
Reference Designator: A3A9A5C22
Service Sheet: 8-A3
Range of Values: 120-150 pF.
Basis of Selection: Selected for proper IF gain. Perform YTO adjustments in this section.
(Change 3)

 # Page 5-8:
For change 19, adjustment 5-23 as been changed. Mark your manual with a reference to the Revised Material For Page 5-8 in this supplement. *(Change 19)*

 # Page 5-9:
For change 30, after marking your manual as indicated in "Page 5-8", delete steps 14 to 18 of the Digital-To-Analog Converter Adjustment.
(Change 30)

Page 5-16:
In step 13, add the following:
"If the level is too low, or if the levels in the following step are not within the levels given, select a new value for C22. Values should be within the range of 120 to 150 pF. 130 pF is usually the best value." *(Errata)*
If A3A9A6 is changed to 0955-0331, (18 dB attenuator, see "Page 6-59"), change step 13 to read "Adjust the IF GAIN A3A9A5R1, so that the displayed IF signal at 30 MHz is 0+/-1 dBm." *(Change 12)*

Page 5-24:
For change 17, delete 5-34 A2A4 Assembly Notch Filter Adjustment.
(Change 17)

Page 5-25:
Paragraph 5-36: A new adjustment procedure is needed. Mark your manual with a reference to the Revised Material for Page 5-25 in this change supplement. *(Change 13)*

Page 5-29:
For Change 13, a new adjustment procedure must added before procedure 5-37. Mark your manual with a reference to procedure 5-36A, Power Clamp Adjustment, in the Revised Material for Page 5-29 in this change supplement. *(Change 13)*

Page 6-2, Table 6-1:
Delete A3A9A3 YTO. *(Errata)*

CHANGE INSTRUCTIONS

Page 6-5, Table 6-3:

Change A1A1 to 08672-~~60210~~ CD4, same description. *(Change 15)*
Delete A1A1DS1-3. *(Change 15)*
Change A1A1DS 4-8 to 1990-1119 CD4, LED-SET LUM-INT=25MCD IF=25MA-MAX BVR=6V. *(Change 15)*
Delete A1A1DS9. *(Change 13)*
Delete A1A1DS10. *(Change 15)*
Add A1A2C1, 0160-4835 CD7 CAPACITOR-FXD .1 UF +/-10% 50 VDC CER. *(Change 6)*

Page 6-6, Table 6-3:

Change A1A5 to 08672-60128 CD 3. *(Change 13)*

Page 6-7, Table 6-3:

Change A1A5C13 to 0140-0196 CD3 CAPACITOR FXD 150 PF +/-5% 300 VDC MICA. *(Change 5)*
Change A1A5C17 to 0160-2200 CD6 CAPACITOR FXD 43 PF +/-5% 300 VDC MICA. *(Change 5)*
Change A1A5Q7 to 1854-0830 CD6 TRANSISTOR-DUAL NPN PD=500 MW. *(Change 5)*
Change A1A5Q7 to 1854-0712 CD3 TRANSISTOR DUAL NPN PD=1.8W. *(Change 8)*
For Change 13, a new page is needed. Mark your manual with a reference to the Revised Material for Page 6-7 in this change supplement. *(Change 13)*

Page 6-8, Table 6-3:

Change A1A6 to 08672-60197 CD6 DET BD AY. *(Change 4)*
For Change 13, two new pages are needed. Mark your manual with a reference to the Revised Material for Page 6-8 (two pages) in this change supplement. *(Change 13)*
In the Revised Material For Page 6-8, change A1A5U8 to 1820-0477 CD6, same description. *(Change 17)*

Page 6-9, Table 6-3:

Delete A1A6C19, 22. *(Change 4)*
Delete A1A6L4. *(Change 4)*
Delete A1A6Q4. *(Change 4)*
Change A1A6R32 to 0757-0459 CD8 RESISTOR 56.2K 1% .125W F TC=0+/-100. *(Errata)*

Page 6-10, Table 6-3:

Delete A1A6R45, 49, 50, 51. *(Change 4)*
\# Change A1A6R37 to 0699-2418 CD9 RESISTOR 32.26K .5% .125W TF TC=0+/-5. *(Change 19)*
\# Change A1A6R40 to 0699-2376 CD8 RESISTOR 30.165K .1% .125W TF TC=0+/-15. *(Change 19)*

Page 6-11, Table 6-3:

Change A1A7R30 to 0698-0083 CD8 RESISTOR 1.96K 1% .125W F TC=0+/-100. *(Change 14)*
Change A1A7U4 to 1820-0477 CD6, same description. *(Change 17)*

CHANGE INSTRUCTIONS

Page 6-12, Table 6-3:

Change A1A8C19 to 0160-4103 CD2 CAPACITOR-FXD 200PF +/-5% 100 VDC CER. *(Change 7)*

Change A1A8Q7 to 1854-0712 CD3 TRANSISTOR-DUAL NPN PD=1.8W. *(Change 6)*

\# Change A1A8R4 to 0699-2446 CD3 RESISTOR 11k 1% .1W TF TC=0+/-10. *(Change 19)*

\# Change A1A8R9 to 0699-2420 CD3 RESISTOR 3.79K .1% .125W TF TC=0+/-10. *(Change 19)*

\# Change A1A8R18 to 0699-2419 CD0 RESISTOR 10.4K .1% .125W TF TC=0+/-10. *(Change 19)*

\# Change A1A8R19 to 0698-3409 CD8 RESISTOR 14.7K .1% .1W TF TC=0+/-10. *(Change 19)*

\# Change A1A8R21 to 0699-2423 CD6 RESISTOR 25.6K .1% .125W TF TC=0+/-10. *(Change 19)*

\# Change A1A8R29 to 0699-2421 CD4 RESISTOR 5.13K .1% .125W TF TC=0+/-5. *(Change 19)*

\# Change A1A8R58 to 0699-0237 CD6 RESISTOR 1.7K .1% .1W TF TC=0+/-5. *(Change 19)*

Page 6-13, Table 6-3:

Change A1A8U2, 3, 6, 9 to 1820-0477 CD6, same description. *(Change 17)*

 # Page 6-16, Table 6-3:

Change A1A10R19 to 0699-2417 CD8 RESISTOR 100K .05% .125W TF TC=0+/-10. *(Change 19)*

Change A1A10R37 to 0699-2418 CD9 RESISTOR 32.26K .5% .125W TF TC=0+/-5. *(Change 19)*

Page 6-17, Table 6-3:

Change A1A10U8 to 1820-0477 CD6, same description. *(Change 17)*

Page 6-18, Table 6-3:

Change A1A12 to 08672-67005 CD9 POWER AMPLIFIER 2-6.2 GHz. *(Change 13)*

Change A1A13 to 08672-60217 CD1, same description. *(Change 18)*

Change A1A13R1 to 82.5k Ohms. *(Errata)*

Change A1A13A1 to 08672-67001 CD5 PREAMPLIFIER ASSEMBLY. *(Errata)*

Delete A1A13A1, PREAMPLIFIER ASSEMBLY (NSR). *(Change 13)*

\# Change A1A14J11 to 1200-1204 CD5 SOCKET-IC 14 PIN DIP DIP-SLDR. *(Change 19)*

CHANGE INSTRUCTIONS

Page 6-20, Table 6-3:

Add to A1AT1, 08672-60114 description; "(includes A1W14, 8120-4121)". *(Errata)*

Change A1AT2 to 0960-0699 CD9 U-WAVE ISOLATOR 6.6 GHZ MAX. *(Change 10)*

Delete A1AT3, PIN MODULATOR. *(Change 13)*

Add A1MP17, 08672-00043 CD1 COVER RF SECTION. *(Errata)*

Change A1MP11 to 08672-20119 WINDOW- FRONT RF. *(Change 13)* ← Change to 20806 Ch. 15 26 49A 04-09138

Change A1S6 to 08672-60076 CD0 SWITCH SLIDE AY. *(Errata)*

Delete A1W2, CABLE, MOD IN. *(Change 13)*

Delete A1W3, CABLE, MOD OUTPUT. *(Change 13)*

Change A1W4 to 1250-1397, ADAPTER. *(Change 13)*

Page 6-21, Table 6-3:

Change 8120-2178 to 8120-4121 CD8. To the description, add "(Part of A1AT1)". *(Errata)*

Page 6-23, Table 6-3:

Change A2A1 to 08672-60209 CD1, same description. *(Change 15)*

Change A2A1DS1, 2, 3 to 1990-0793 CD8, LED-SET LUM-INT=25MCD IF=25MA-MAX BVR=6V. *(Change 15)*

Delete A2A1DS4-10. *(Change 15)*

Add A2A1DS12-19, 1990-1118 CD3, LED-SET LUM-INT=25MCD IF=25MA-MAX BVR=6V. *(Change 15)*

Page 6-24, Table 6-3:

Change A2A1U7 to 1826-0065 CD0, same description. *(Change 17)*

A2A2: If replacement is needed, use the part listed in Change 8. *(Errata)*

Change A2A2 to 0960-0684 CD2. *(Change 8)*

Change A2A3 to 08672-60212 CD6, same description. *(Change 17)*

Change A2A3C2 to 0160-0164 CD7 CAPACITOR-FXD .039UF +/-10% 200VDC POLYE. *(Change 17)*

Page 6-26, Table 6-3:

Change A2A4Q1 to 1854-0712 CD3 TRANSISTOR-DUAL NPN PD=1.8W. *(Change 6)*

A2A4U4: If replacement is needed, use the part listed in Change 10. *(Errata)*

Change A2A4U4 to 1820-1645 CD2 IC BFR TTL LS BUS QUAD. *(Change 10)*

See the instructions for Pages 6-26 through 6-27, Table 6-3. *(Change 17)*

\# In the Revised Material for Pages 6-26 through 6-27, change A2A4C21 to 0160-5901 CD0 CAPACITOR-FXD 10PF +/-.5PF 200 VDC CER. *(Change 19)*

Pages 6-26 through 6-27, Table 6-3:

For the A2A4 parts list, mark your manual with a reference to the Revised Material For Pages 6-26 through 6-27 in this supplement. *(Change 17)*

Page 6-28, Table 6-3:

Delete A2A6. *(Change 18)*

CHANGE INSTRUCTIONS

Page 6-30, Table 6-3:
Change A2A8C7 to 0160-4389 CD6 CAPACITOR-FXD 100PF 5% 200 VDC.
(Change 2)

Page 6-31, Table 6-3:
Change A2A9U1 to 1820-1747 CD5 IC GATE CMOS NAND QUAD 2-INPUT.
(Errata)

Page 6-33, Table 6-3:
Change A2A11C8 to 0160-3334 CD9 CAPACITOR-FXD .01UF +/-10% 50VDC CER.
(Change 17)

Page 6-34, Table 6-3:
Change A2A11U21 to 1820-1432 CD5. *(Change 10)*

Page 6-35, Table 6-3:
Change A2A12 to 08672-60213 CD8, same description.
(Change 18)
Change A2A12W1 to 08672-20193 CD8. *(Errata)*

Page 6-36, Table 6-3:
Add A2W4 5060-0366 CD4, Qty 1, RIBBON CABLE ASSY-50 PIN.
(Change 18)

Page 6-37, Table 6-3:
A3A1A1C8: If replacement is needed, use the part listed in Change 1.
(Errata)
Change A3A1A1C8 to 0180-1846 CD5 CAPACITOR 2.2UF 10% 35 VDC.
(Change 1)

Page 6-39, Table 6-3:
Change A3A1A1U5 to 1820-0477 CD6, same description. *(Change 17)*
Change A3A1A2C4 to 0121-0493 CD3 CAPACITOR-V TRMR-AIR 1.7-11PF 175V.
(Change 17)
Change A3A1A2C8 to 0160-2251 CD7 CAPACITOR-FXD 5.6PF +/-25PF 500VDC CER. *(Change 17)*

Page 6-40, Table 6-3:
Delete A3A1A2C41. *(Change 6)*
Delete A3A1A2C45. *(Change 12)*

Change A3A1A2L2 to 9100-2250 CD9 INDUCTOR RF-CH-MLD 180NH 10%
(Change 17)

Page 6-41, Table 6-3:
Change A3A1A2R67, 69 to 0698-3437 CD2 RESISTOR 133 1% .125W F TC=0+/-100. *(Change 17)*
Change A3A1A2R68 to 0698-4037 CD0 RESISTOR 47.4 1% .125W F TC=0+/-100. *(Change 17)*

Page 6-42, Table 6-3:
See the instructions for Pages 6-42 through 6-45, Table 6-3.
(Change 16)

CHANGE INSTRUCTIONS

Page 6-44, Table 6-3:

Add an asterisk (*) to A3A1A5L2 to indicate a factory selected component. The allowable range of inductor values is 39-68 nH. *(Change 12)*

See the instructions for Pages 6-42 through 6-45, Table 6-3: *(Change 16)*

\# In the Revised Material For Pages 6-42 through 6-45 in this supplement, change A3A1A5C30 to 0160-0575 CD4 CAPACITOR-FXD .047 UF +/-20% 50VDC CER. *(Change 19)*

Page 6-45, Table 6-3:

In the Revised Material For Pages 6-42 through 6-45, change A3A1A5R42 to 0698-7272 CD1 RESISTOR 31.6K 1% .05W F TC=0+/-100. *(Change 17)*

Pages 6-42 through 6-45, Table 6-3:

For the A3A1A3 and A3A1A5 parts lists, mark your manual with a reference to the Revised Material For Pages 6-42 through 6-45 in this change supplement. *(Change 16)*

Page 6-46, Table 6-3:

Change A3A1A6 to 86701-60099 CD7, same description. *(Change 16)*

Change A3A1A6 to 86701-60101 CD2, same description. *(Change 18)*

\# Delete A3A1A6C9, MP4, MP6. *(Change 19)*

Change A3A2 to A3A12, 08673-60133 CD1, same description. *(Change 14)*

Change A3A2C8, 9 to 0160-6633 CD3 CAPACITOR-FXD 2.2UF +/-20% 100V. *(Change 14)*

Change A3A2R6, 8 to 0757-0346 CD2 RESISTOR 10 1% .125W F TC=0+/-100. *(Change 14)*

Change A3A2R7 to 0698-3428 CD1 RESISTOR 14.7 1% .125W F TC=0+/-100. *(Change 14)*

Under A3A2U1 add 1200-0043 CD8 INSULATOR TO-3. *(Change 1)*

Change all part number prefixes of A3A2 to A3A12. *(Change 14)*

Page 6-47, Table 6-3:

A3A3: If replacement is needed, use the part listed in Change 11. *(Errata)*

Change A3A3 to 86701-60096 CD4. *(Change 11)*

\# Change A3A3CR9, 10 to 1990-0486 CD6 LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V. *(Change 19)*

Add A3A3R61, 0698-3631 CD8 RESISTOR 330 1% .125W F TC=0+/-100. *(Change 8)*

Page 6-48, Table 6-3:

Change A3A3R47 to 0757-0288 CD1 9.09K 1% .125W F TC=0+/-100. *(Change 7)*

Change A3A3U2, 3 to 1820-0477 CD6, same description. *(Change 17)*

A3A4: If replacement is needed, use the part listed in Change 11. *(Errata)*

Change A3A4 to 86701-60095 CD3. *(Change 11)*

CHANGE INSTRUCTIONS

Page 6-49, Table 6-3:

Add A3A4C17 0160-6295 CD7 CAPACITOR-FXD 910PF +/-5% 50 VDC CER. *(Change 11)*

\# Change A3A4CR10, 11, 13 to 1990-0486 CD6 LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V. *(Change 19)*

Page 6-50, Table 6-3:

Change A3A4U1-3 to 1820-0477 CD6, same description. *(Change 17)*

Change A3A6Q5 to 1854-0712 CD3, TRANSISTOR-DUAL NPN PD=1.8W. *(Change 6)*

\# For the A3A5 parts list, mark your manual with a reference to the Revised Material For Pages 6-50 through 6-51 in this supplement. *(Change 19)*

Page 6-51, Table 6-3:

A3A5U2-4: If replacement is needed, use the part listed in Change 10. *(Errata)*

Change A3A5U2-4 to 1826-0013 CD8. *(Change 10)*

Page 6-52, Table 6-3:

\# Change A3A6Q2, Q6 to 1854-0810 CD2, same description. *(Change 19)*

Change A3A6Q9 to 1854-0712 CD3 TRANSISTOR-DUAL NPN PD=1.8W. *(Change 6)*

Page 6-55, Table 6-3:

Change A3A7R65 to 0698-3155 CD1 RESISTOR 4.64K 1% .125W F TC=0+/-100. *(Change 17)*

Change A3A7R75 to 0698-0083 CD8 RESISTOR 1.96K 1% .125W F TC=0+/-100. *(Change 17)*

A3A7U1: If replacement is needed, use the part listed in Change 10. *(Errata)*

Change A3A7U1 to 1826-0013 CD8. *(Change 10)*

Delete A3A9. *(Errata)*

Page 6-56, Table 6-3:

Change A3A9U1 to 86701-67001 CD5, Sampler Assembly. *(Errata)*

Change A3A9A3 to 5086-7131 CD9 2-6.2 GHz YTO ASSEMBLY. *(Errata)*

Delete 5086-6131 RESTORED ASSEMBLY. *(Errata)*

Page 6-57, Table 6-3:

Add A3A9A4J1-6, 1251-0600 CD0 CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ-SQ. *(Errata)*

Change A3A9A4Q4 to 1854-0712 CD3 TRANSISTOR DUAL NPN PD=1.8W. *(Change 6)*

CHANGE INSTRUCTIONS

Page 6-58, Table 6-3:

Change A3A9A4U2 to 1826-0065 CD0, same description. *(Change 17)*

Change A3A9A5 to 086701-60089 CD5. *(Change 3)*

Delete A3A9A5C16. *(Change 3)*

A3A9A5C22: If replacement is needed, use the part listed in Change 3. *(Errata)*

Change A3A9A5C22 to 0140-0196 CD3 CAPACITOR-FXD 150PF +/-5% 300 VDC MICA. *(Change 3)*

Add A3A9A5J1, 1251-3172 CD7 CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ-RND. *(Errata)*

Add A3A9A5J2, 1251-0600 CD0 CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ-SQ. *(Errata)*

Change A3A9A5L10 to 9140-0539 CD7 INDUCTOR RF CH MLD 3.0UH +/-5% .105Dx.26 LG. *(Change 3)*

Page 6-59, Table 6-3:

Change A3A9A5Q4 to 1855-0235 CD8 TRANSISTOR J-FET N-CHAN. *(Change 3)*

Delete A3A9A5R12, 14. *(Change 13)*

Change A3A9A5R15, 17 to 0757-0424 CD7 RESISTOR 1.1K 1% .125W F TC=0+/-100. *(Change 3)*

Change A3A9A5R18 to 0757-0419 CD0 RESISTOR 681 1% .125W F TC=0+/-100. *(Change 3)*

Change A3A9A5R22 to 0698-7195 CD7 RESISTOR 19.6 1% .125W F TC=0+/-100. *(Change 3)*

Change A3A9A6 to 0955-0331 CD5 ATTENUATOR ASSEMBLY, 18 dB. *(Change 12)*

Change A3A10 to 86701-60093 CD1. *(Change 9)*

Change A3A10 to 08672-60215 CD9, same description. *(Change 9)*

Change A3A10J3 to 1252-0473 CD7. *(Change 9)*

Add A3A9A5TP1, 1251-0600 CD0 CONNECTOR-SGL CONTACT PIN 1.14-MM-BSC-SZ SQ. *(Errata)*

Page 6-61, Table 6-3:

Add A3P1, 86701-60067 CD9 SHORTING PLUG (OPT 002 ONLY). *(Errata)*

Change A3P1 to 5060-0346 CD0. *(Change 9)*

Change A3W8 to 86701-60053 CD3. *(Errata)*

Add A3W18 5060-9462 CD9 HP-IB ADAPTER. *(Errata)*

Page 6-62, Table 6-3:

Add 6690-0121 CD8 PLUG-HOLE DOME-HD FOR .625-D-HOLE BRS. *(Errata)*

Change 86701-40004 HEAT SINK to 86701-20004 CD0 HEAT SINK. *(Errata)*

Add 3050-0139 CD6, Qty 4, WASHER FL MTLC NO.8 .173-IN-ID, FAN MTG. *(Change 10)*

CHANGE INSTRUCTIONS

Page 6-63, Table 6-3:

Add item 7A, 2360-0195 CD0 SCREW MACHINE 6-32 .312-IN-LG PAN-HD-POZI. *(Errata)*

Change item 5 to the following:
item 5, 86701-00038 CD8, Qty 1, STRUT, LOWER LEFT
item 5A, 86701-00039 CD9, Qty 1, STRUT, LOWER RIGHT
item 5B, 5020-8883 CD2, Qty 2, STRUT, UPPER
item 5C, 2510-0192 CD6, Qty 12, SCREW, 8-32, .25 IN.
item 5D, 2510-0195 CD9, Qty 8, SCREW, 8-32, .375 IN.
(Errata)

For Change 13, a different table is needed. Mark your manual with a reference to the Revised Material for Page 6-63 in this change supplement. *(Change 13)*

In the Revised Material For Page 6-63, under item 17, add the following:
08672-00124 CD3, Qty1, COVER, BOTTOM 21", OPTIONS 034 AND 038 ONLY.
(Change 17)

Service Sheet 4, Figure 8-24:

A partial schematic is needed. Mark your manual with a reference to the Revised Material for Service Sheet 4 in this change supplement. *(Change 13)*

Service Sheet 1-A1 (schematic):

Remove "NSR" from A1A13A1. *(Errata)*

In the upper left corner, change off-page connector FQ to FG. *(Errata)*

On A1A13, change pin numbers:
48 to 47, and 47 to 48
11 to 10, and 10 to 11
(Errata)

Change C13 to 150 pF. *(Change 5)*

Change C17 to 43 pF. *(Change 5)*

Change C25 to 68 pF. *(Change 8)*

In the table of Transistor and Integrated Circuit Part Numbers, change Q7 to 1854-0830. *(Change 5)*

In the table of Transistor and Integrated Circuit Part Numbers, change Q7 to 1854-0712. *(Change 8)*

In the table of Transistor and Integrated Circuit Part Numbers, Change U8 to 1820-0477. *(Change 17)*

For Change 13, two partial schematics are needed. Mark your manual with a reference to the Revised Material for Service Sheet 1-A1 in this change supplement. *(Change 13)*

For serial number prefixes 2747A and above, W10 has been deleted. On the upper left corner of the schematic, delete "P/O W10". The off-page connectors to Service Sheet 5-A2 attach directly to A1A13. *(Change 18)*

CHANGE INSTRUCTIONS

Service Sheet 2-A1 (schematic):

Change the wiper connection of R20 to the opposite end. *(Errata)*

A partial schematic is needed. Mark your manual with a reference to the Revised Material for Service Sheet 2-A1 in this change supplement. *(Errata)*

Change C19 to 220 pF. *(Change 7)*

In the table of Transistor and Integrated Circuit Part Numbers, change Q7 to 1854-0712. *(Change 5)*

In the table of Transistor and Integrated Circuit Part Numbers, change U2, 3, 6, 9 to 1820-0477. *(Change 17)*

Service Sheet 3-A1 (schematic):

In the lower right corner, change R30 to 5110 Ohms. *(Errata)*

In the lower right corner, change R30 to 1.96k Ohms. *(Change 14)*

In the table of Transistor and Integrated Circuit Part Numbers, change U4 to 1820-0477. *(Change 17)*

Service Sheet 4-A1, Figure 8-35 (component locator):

Delete C19, C22, L4, Q4, R45, R48, R49, R50, R51. *(Errata)*

Service Sheet 4-A1 (schematic):

On pins 5 and 6 of Q5B, change the voltages in the hexagons to 0.047V. *(Errata)*

Delete Q4A & B, C19, L4, R45, R50, R51, R48, and U1. In place of the deleted parts, mark your manual with a reference to the partial schematic in the Revised Material for Service Sheet 4-A1 in this change supplement. *(Change 4)*

Change R32 to 56.2k Ohms. *(Errata)*

In the upper left corner of the schematic, change A10C1 DIRECTIONAL COUPLER to A1DC1 DIRECTIONAL COUPLER. *(Errata)*

Service Sheet 5-A1, Figure 8-38 (component locator):

Interchange CR3 and CR 11. Interchange CR4 and CR12. Interchange CR8 and CR16. *(Errata)*

Service Sheet 5-A1 (schematic):

Locate cable A1W14 on the upper right side of the schematic. Add the notation "(P/O A1AT1)". *(Errata)*

In the table of Transistor and Integrated Circuit Part Numbers, change U8 to 1820-0477. *(Change 17)*

Service Sheet 6-A1 (schematic):

On the left side of the schematic, on P/O A1A14, change connector XA1A11B to XA1A13, and XA1A13 to XA1A11B. *(Errata)*

On the right side of the schematic, locate U9F. Delete the line connecting U9F pin 14 to U6 pin 11 and R19. Ensure that U9F pin 14 connects only to U6 pin 10 and R20. *(Errata)*

In the lower right corner of the schematic, delete off-page connector PS 5-A2 and the lines and connectors marked LEV UNCAL. *(Errata)*

For serial number prefixes 2747A and above, W10 has been deleted. On the left side of the schematic, delete

"P/O W10". The off-page connectors to Service Sheet 5-A2 attach directly to A1A13. *(Change 18)*

Service Sheet 7-A1 (schematic):

Add A1A2C1, 0.1 uF, between Q11 base and ground. *(Change 6)*

In the lower half of the middle of the schematic, near the FM DEVIATION MHz switch, delete the line that connects J1 pin 23 and J1 pin 27. *(Errata)*

Change the incandescent indicators (DS1-16) to solid-state devices (light-emitting diodes). *(Change 15)*

Change the reference designators of the indicators as follows:

Change DS1 to DS5a.
Change DS2 to DS6a.
Change DS3 to DS5b.
Change DS4 to DS6b.
Change DS5 to DS5c.
Change DS6 to DS6c.
Change DS7 to DS7b.
Change DS8 to DS7a.
Change DS10 to DS8a.
Change DS11 to DS8b.
Change DS12 to DS4a.
Change DS13 to DS5d and DS6d.
Change DS14 to DS4c.
Change DS15 to DS4d.
Change DS16 to DS4b.
(Change 15)

Service Sheet 1-A2 (schematic):

On the upper right side of the schematic, disconnect U5C pin 9 from the existing lines and connect it instead to U11 pin 12. *(Errata)*

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A3A10 and A2A12. On the left side of the schematic, between A3A10 and A2A12, change the following edge connector pin numbers:

a.) Change 43 to 35.
b.) Change 44 to 11.
c.) Change 15, 45 to 12, 13, 37, 38.
d.) Change 18, 48 to 15, 16.
e.) Change 19, 49 to 40, 41.
f.) Change 20, 50 to 17.
g.) Change 17, 47 to 14.
h.) Change 46 to 39.
(Change 18)

Service Sheet 2-A2, Figure 8-54 (component locator):

A different component locator is needed. Mark your manual with a reference to the Revised Material for Service Sheet 2-A2 in this change supplement. *(Errata)*

CHANGE INSTRUCTIONS

Service Sheet 2-A2 (schematic):

In the table of Transistor and Integrated Circuit Part Numbers, change Q1 to 1854-0712. *(Change 6)*

In the table of Transistor and Integrated Circuit Part Numbers, change U4 to 1820-1645. *(Change 10)*

For change 17 a different schematic is needed. Mark your manual with a reference to the Revised Material for Service Sheet 2-A2 in this supplement. *(Change 17)*

In the Revised Material For Service Sheet 2-A2, in the upper right section of the schematic, near U10B, change C21 to 10 pF. *(Change 19)*

Service Sheet 3-A2 (schematic):

Change the units designators of L1, L4, L5, L6, L7, and L8 from mH to uH. *(Errata)*

Service Sheet 4-A2 (schematic):

On the right side of the schematic locate U26 and U27. Follow the output of U26 to U21A, U28F, U28B, and U28C and delete the polarity symbol from the output of these IC's. Follow the outputs of U27 to U28A, U28E and U28D and delete the polarity symbol from the output of these IC's. *(Errata)*

Service Sheet 5-A2, Figure 8-64:

In the Interface Block Diagram, on the left side of the diagram labeled P/O HP-IB INTERFACE, change the board reference for DI 1-7 from "4-A1" to "4-A2". *(Errata)*

For serial number prefixes 2747A and above, A2A6 and A3W10 have been deleted. In the lower right corner of the schematic:

a.) Delete "P/O W10".
b.) Delete all edge connectors associated with "P/O J3" (next to "W10").
c.) Attach the off-page connectors directly to A2W3.

In the lower left corner of the schematic:

a.) Delete "P/O A2A6".
b.) Change "P/O A3" to "P/O A1A13".
c.) Attach the line from "P/O A2W3" directly to "P/O A1A13".

In the upper center of the schematic:

a.) Delete "P/O A2A6".
b.) Change "P/O A3" to "P/O A1A13".
c.) Attach the digital lines from "P/O A2W3" directly to "P/O A1A13".

(Change 18)

Service Sheet 6-A2 (schematic):

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A2A12 and A3A10. On the upper left corner of the schematic, between A2A12 and A3A10, change the following edge connector pin numbers:

a.) Change 29 to 25.
b.) Change 21 to 42.
c.) Change 16 to 36.
d.) Change 6 to 2.

(Change 18)

CHANGE INSTRUCTIONS

Service Sheet 7-A2 (schematic):

In the lower right corner of the schematic, near U4E, add "U12A" to the OR gate labeled "1 MHz LIMIT". *(Errata)*

In the middle of the schematic, change the pin numbers of U25 as follows: change 4 to 1, and 1 to 4. *(Errata)*

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A2A12 and A3A10. In the upper and lower right corners of the schematic, between A2A12 and A3A10, change the following edge connector pin numbers:

a.) Change 36 to 28.
b.) Change 35 to 29.
c.) Change 34 to 27.

(Change 18)

Service Sheet 8-A2:

On page 8-72, in the service text for Service Sheet 8-A2, change step 4 of the troubleshooting information to read "...control is turned counterclockwise and low when turned clockwise." *(Errata)*

Service Sheet 8-A2 (schematic):

In the upper center section of the schematic, below U6A, interchange pin numbers 2 and 3 on U7A. *(Errata)*

In the table of Transistor and Integrated Circuit Part Numbers, change U21 to 1820-1432. *(Change 10)*

Service Sheet 9-A2 (schematic):

In the upper right corner of the schematic, at the off-page reference to Service Sheet 8-A2, change "EN" to "NL", "EP" to "LP", and "EO" to "LO". *(Errata)*

Service Sheet 10-A2 (schematic):

On the left side of the schematic, add A2A8R27, 100 Ohms, in series with the NCLK2 line between pin 17 and the C7/U23 pin 11 junction. *(Change 1)*

CHANGE INSTRUCTIONS

Service Sheet 11-A2 (schematic):

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A2A12 and A3A10. Change the edge connector pin numbers as shown in the table below.

Digital Line	New Pin Number
M5	8
M3	7
M4	34
M1	6
M2	33
N5	5
N6	32
N3	4
N4	31
N2	30
N1	3
DAC3200 MHz	18
DAC800 MHz	19
DAC400 MHz	20
DAC200 MHz	21
DAC100 MHz	22
DAC4800 MHz	44
DAC10 MHz	49
DAC20 MHz	24
DAC40 MHz	50
DAC80 MHz	23
DAC 8MHz	48
DAC 4MHz	47
DAC 2MHz	46
DAC 1MHz	45

(Change 18)

CHANGE INSTRUCTIONS

Service Sheet 12-A2 (schematic):

In the lower right corner, on the output line marked "+/- 1 BIT", Change pin 7 to pin 1 (2 places). *(Errata)*

On the right side of the schematic, locate P/O A2A12J1 pin 12 and delete "5" from the off-page connector marked CY 5,7,8-A1. *(Errata)*

Change the incandescent indicators (DS2, 3, 5-10) to solid state devices (light-emitting diodes). *(Change 15)*

Change the reference designators of the indicators as follows:
Change DS2 to DS3a.
Change DS3 to DS3b.
Change DS5 to DS2b.
Change DS6 to DS2a.
Change DS7 to DS12.
Change DS8 to DS13 and DS14.
Change DS9 to DS15 and DS16.
Change DS10 to DS17-19.
(Change 15)

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A2A12 and A3A10. On the left side of the schematic, change the following edge connector pin numbers:
a.) Change 13 to 9.
b.) Change 14 to 10.
(Change 18)

Service Sheet 13-A2 (schematic):

In the lower right side of the schematic, delete the part number for A2A2 RPG ASSY. *(Errata)*

Change C7 to 100 pF. *(Errata)*

In the upper right corner of the schematic, change C8 to 33 uF. *(Errata)*

Change the incandescent indicators (DS1, DS4) to solid state devices (light-emitting diodes). *(Change 15)*

Change the reference designators of the indicators as follows:
Change DS1 to DS1a.
Change DS4 to DS1b.
(Change 15)

In the table of Transistor and Integrated Circuit Part Numbers, change U7 to 1826-0065. *(Change 17)*

For serial number prefixes 2747A and above, there is a ribbon cable (A2W4) between A2A12 and A3A10. On the left side of the schematic, change edge connector pin number 33 to 26. *(Change 18)*

Service Sheets 1-A3 through 13-A3 (schematics):

Change A3A10 Motherboard Assembly to 86701-60093. *(Change 9)*

CHANGE INSTRUCTIONS

Service Sheet 1-A3 (schematic):

Above A3A8 10 MHz Reference Oscillator Assembly, add the following:
FOR OPTION OO2, SEE NOTE 2. *(Errata)*

At the right side of the schematic, add the following:
NOTE 2. FOR OPTION 002 (DELETE REFERENCE OSCILLATOR), INSTALL SHORTING PLUG A3P1, WHICH CONNECTS A SHORT BETWEEN PINS 4 AND 5, TO KEEP THE OVEN COLD INDICATOR TURNED OFF. *(Errata)*

Service Sheet 2-A3, Figure 8-93 (component locator):

Interchange T1 and T3. *(Errata)*

On the lower middle of the component locator, next to C52, Change C35 to C53. *(Errata)*

Service Sheet 2-A3 (schematic):

Delete C41. *(Change 6)*

Delete C45. *(Change 12)*

Service Sheet 3-A3 (schematic):

For change 16, a different schematic is needed. Mark your manual with a reference to the Revised Material For Service Sheet 3-A3 in this change supplement. *(Change 16)*

In the Revised Material For Service Sheet 3-A3, on the left side of the schematic:

a.) Under "P/O A3A1A6", delete C13-23. *(Change 18)*

b.) Under "P/O A3A10", on off-page connector "JT", change "M1" to "M2". *(Change 16)*

For serial number prefixes 2747A and above, inductors have been placed in series with the digital lines on the A3A10 Motherboard Assembly. On the Revised Material For Service Sheet 3-A3, on the left side of the page, draw the inductors onto their corresponding digital lines as shown in the following table.

Digital Line	Inductor Reference Designator	Inductor Value
N1	L12	4.7 nH
N2	L11	4.7 nH
N3	L10	4.7 nH
N4	L9	4.7 nH
N5	L8	4.7 nH
N6	L7	4.7 nH
M1	L4	4.7 nH
M2	L5	4.7 nH
M3	L2	4.7 nH
M4	L3	4.7 nH
M5	L1	4.7 nH
M/N UNLOCK	L6	4.7 nH

(Change 18)

CHANGE INSTRUCTIONS

Service Sheet 5-A3 (schematic):

Add an asterisk (*) to L2 to indicate a factory selected component. The allowable range of inductor values is 39-68 nH. *(Change 12)*

For change 16, a different schematic is needed. Mark your manual with a reference to the Revised Material For Service Sheet 5-A3 in this change supplement. *(Change 16)*

\# In the Revised Material for Service Sheet 5-A3, on the left side of the schematic, on the -40V(F) power supply line, change C30 to .047 uF. *(Change 19)*

 # Page 8-92 (text):

For change 19, new theory of operation for the Revised Material for Service Sheet 6-A3 is needed. Mark your manual with a reference to the Revised Material For Page 8-92 in this supplement. *(Change 19)*

Service Sheet 6-A3 (schematic):

In the table of Transistor and Integrated Circuit Part Numbers, change Q5 to 1854-0712. *(Change 6)*

In the table of Transistor and Integrated Circuit Part Numbers, change U2-4 to 1826-0013. *(Change 10)*

\# For change 19 a different schematic is needed. Mark your manual with a reference to the Revised Material for Service Sheet 6-A3 in this supplement. *(Change 19)*

Service Sheet 7-A3 (schematic):

In the table of Transistor and Integrated Circuit Part Numbers, change Q9 to 1854-0712. *(Change 6)*

Service Sheet 8-A3, Figure 8-111 (component locator):

Delete R12, R14, and C16. *(Change 3)*

Service Sheet 8-A3 (schematic):

For Change 3, a partial schematic is needed. Mark your manual with a reference to the Revised Material for Service Sheet 8-A3 in this change supplement. *(Change 3)*

On the upper left of the schematic, change the part number of the A3A9A5 SAMPLER ASSEMBLY to 86701-60089. *(Change 3)*

Change the REFERENCE DESIGNATIONS table to indicate the deletions of R12, R14, and C16. *(Change 3)*

In the TRANSISTOR PART NUMBERS table, change Q4 to 1855-0235. *(Change 3)*

On the left side of the schematic, in the SAMPLER DRIVE AMPLIFIER, interchange the positions of R2 and C6. *(Errata)*

Service Sheet 9-A3 (schematic):

Delete the connection between CR11 and R22. Instead, connect CR11 to U3A pin 1, and R22 to U3B pin 8. *(Errata)*

In the table of Transistor and Integrated Circuit Part Numbers, change Q4 to 1854-0712. *(Change 6)*

In the table of Transistor and Integrated Circuit Part Numbers, change U2 to 1826-0065. *(Change 17)*

CHANGE INSTRUCTIONS

Service Sheet 10-A3 (schematic):

In the lower left corner of the schematic, add "1" to the unmarked output pin of U3A. *(Errata)*

In the lower right side of the page, change the description of A3A9A6 to "18 dB ATTENUATOR (0955-0331). *(Change 12)*

In the table of Transistor and Integrated Circuit Part Numbers, change U1 to 1826-0013. *(Change 10)*

Service Sheet 12-A3 (schematic):

In the upper left corner, change the A3A3 part number to 86701-60090. *(Change 8)*

In the upper left corner, change the A3A3 part number to 86701-60096. *(Change 11)*

Change R47 to 9090 Ohms. *(Change 7)*

In the upper right corner of the schematic add R61, 330 Ohms, connected from +20V to ground. *(Change 8)*

In the table of Transistor and Integrated Circuit Part Numbers, change U2, 3 to 1820-0477. *(Change 17)*

Service Sheet 13-A3 (schematic):

In the upper left corner, change the A3A4 part number to 86701-60095. *(Change 11)*

Add capacitor C17, 910 pF, from U2 pin 6 to the anode of CR3 (across R4). *(Change 11)*

In the table of Transistor and Integrated Circuit Part Numbers, change U1-3 to 1820-0477. *(Change 17)*

Page 8-113/8-114:

Interchange CR3 and CR2. *(Errata)*

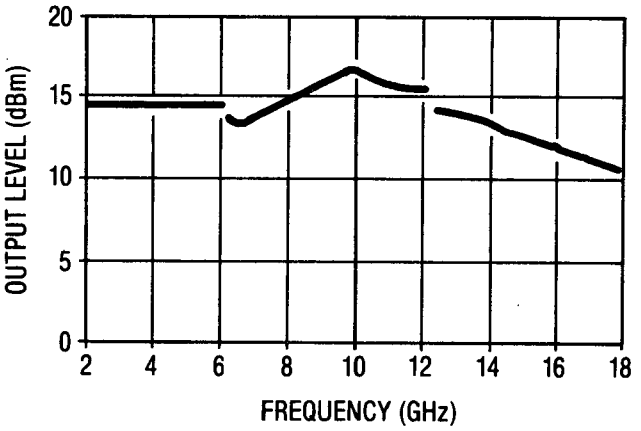


Figure 4-1A. Typical Maximum Power Available.

ADJUSTMENTS

5-23. Digital-to-Analog Adjustment

REFERENCE Service Sheet 6-A3

DESCRIPTION This adjustment sets the analog output voltage with respect to the digital frequency tuning data.

EQUIPMENT Digital Voltmeter (DVM) ..... HP 3456A

PROCEDURE

1. ~~Key in RCL 0 on the Signal Generator~~ and set the frequency to 6598.000 MHz.
2. Connect the DVM ground lead to the reference ground, A3A6TP5. (The ground lead remains connected here for the rest of the procedure).
3. Check the voltage of the Reference Voltage Buffer at A3A5TP4. Verify that the voltage is −6.300 ±0.063 Vdc. Make repairs if necessary.
4. Connect the DVM to the YTO Pretune Output, A3A5TP5.
5. Connect test points A3A5TP1 and A3A5TP2 together with an alligator clip.
6. Adjust A3A5R15 (OFFSET) to obtain a DVM reading of +6.00 mV ±0.02 mVdc.
7. Remove the alligator clip from testpoints A3A5TP1 and A3A5TP2.
8. Adjust A3A5R8 (GAIN) to obtain a voltage of ~~−19.794~~ −18.519 ±0.001 Vdc.
9. Tune the Signal Generator to 3066.000 MHz. Verify that the voltage at A3A5TP5 is −9.198 ±~~0.003~~ 0.002 Vdc.
10. Tune the Signal Generator to 4049.000 MHz. Verify that the voltage at A3A5TP5 is −12.147 ±~~0.03~~ 0.02 Vdc.
11. Disconnect the DVM from the Signal Generator.

* Remarks per Scott [illegible] and Cliff [illegible]

5-36A. YTM ADJUSTMENT

Reference Service Sheets 2-A1 and 3-A1.

Description The 12.4 volt reference is adjusted. A low frequency signal is applied to the tuning coil of the YTM (YIG Tuned Multiplier) to sweep the filter through its response curve. The tuning coil drive is adjusted to obtain maximum RF output from the YTM by centering the filter response about the RF output signal. The tuning coil adjustments are repeated to optimize the filter's tracking over the 2 to 18 GHz frequency range. The SRD (Step Recovery Diode) bias for the YTM is adjusted.

Equipment

Digital Voltmeter (DVM)	HP 3456A or 3455A
Oscilloscope	HP 1980B
Power Meter	HP 436A
Power Sensor	HP 8481A
Step Attenuator	HP 8495A Option 002
Test Oscillator	HP 8116A

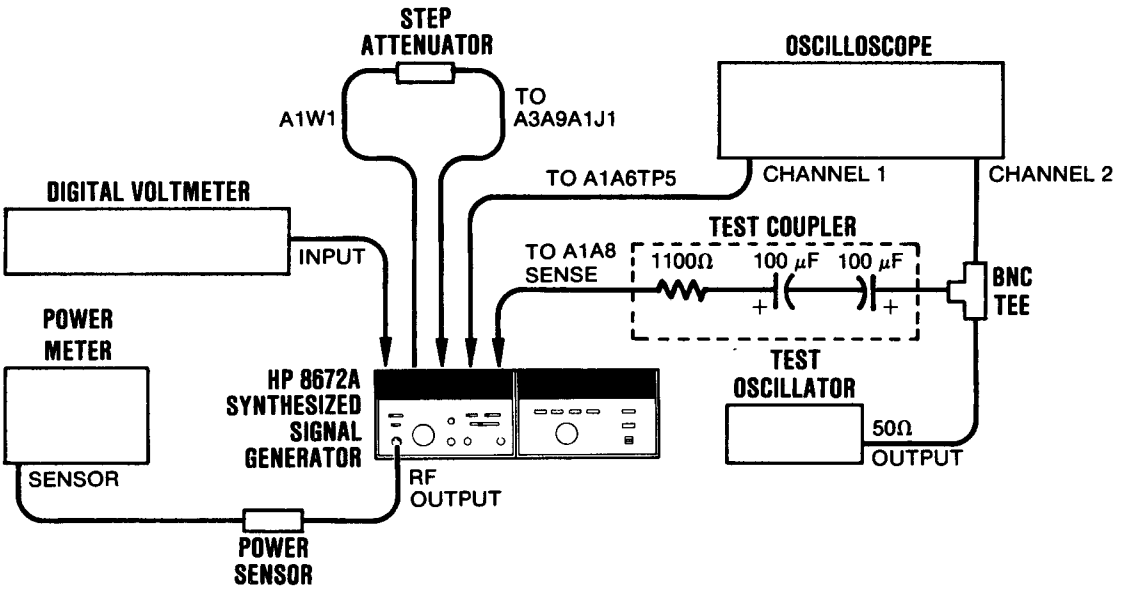


Figure 5-11. YTM Adjustment Test Setup

Procedure

12.4 Volt Reference

1. Set the Signal Generator as follows:

LINE switch	ON
RF OUTPUT	ON
ALC	XTAL
RANGE	+10 dBm
VERNIER	fully clockwise
Frequency	2000.000 MHz
PEAK/NORM control	NORM
CAL control	fully clockwise
AM	OFF
FM	OFF

5-36A. YTM ADJUSTMENT (cont'd)

Procedure (cont'd)

2. Allow the instrument 30 minutes to warm up with these instrument settings.
3. Connect the DVM to the +12.4V test point on A1A8. Connect the ground lead to the GND test point on A1A8.
4. Adjust A1A8R64, +12.4V, for +12.400 ± 0.005 Vdc.

Band 1 Adjustment (2.0 to 6.199 GHz)

5. Connect the DVM to the +C.S. test point on A1A8.
6. Adjust A1A8R46, BD1 LO, for +8.0 ± 0.2 Vdc.
7. Center A1A7R31, BIAS, and A1A7R29, PWR.
8. Disconnect A1W1 from directional coupler output at A3A9A1J1 (see Service Sheet B, Top View Assembly Locations). Connect a step attenuator between A3A9A1J1 and A1W1. Connect the remaining equipment as shown in Figure 5-11.

   The locally fabricated "test coupler" consists of the resistor and two capacitors shown in the figure.
9. Set the test oscillator output for 60 Hz at 900 mV peak to peak as indicated by the oscilloscope.
10. Set the oscilloscope to 1 vs. 2 mode and adjust channel 2 sensitivity for a ten division horizontal sweep. Set channel 1 sensitivity to approximately 30 mV per division.
11. Remove the blue cable from A2A12 RF amplifier assembly. Removing the cable disables the power clamp for this adjustment.
12. Set the step attenuator for 10 dB attenuation. In the following steps, if the oscilloscope display shows an erratic passband response (squegging), set the attenuator for a higher attenuation. Attenuator settings of 10 to 20 dB should be sufficient to stop squegging for Band 1 frequencies. Increasing the attenuation reduces the power at the input of the YTM and also reduces the sensitivity of the displayed signal. Therefore, keep the attenuator set for as low an attenuation as necessary to stop squegging.
13. Adjust A1A8R46, BD1 LO, at 2 GHz to center the peak of the YTM response as shown in Figure 5-12. The display may show a retrace pattern due to hysteresis in the YTM circuitry. The center of the filter passband is halfway between the peaks of the two displayed signals.
14. Tune to 6 GHz and adjust A1A8R20, BD1 HI, to center the filter response.
15. Tune from 2 to 6 GHz using 1 MHz tuning resolution while observing the oscilloscope display. The peak of the filter passband should remain within ± 5 divisions of the center of the display and should remain reasonably centered.

    Readjust the step attenuator as required to maintain a smooth curve. If necessary, repeat steps 13 through 15 until the response remains reasonably well centered. The last adjustment should be at 6 GHz.

5-36A. YTM ADJUSTMENT (cont'd)

Procedure (cont'd)

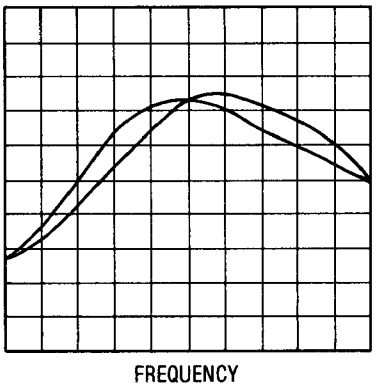


Figure 5-12. Optimum YTM Response, 2 to 12 GHz

Band 2 Adjustment (6.2 to 12.399 GHz)

16. Set the step attenuator to 0 dB attenuation. The attenuator should be set to 0 dB for frequencies above 6.2 GHz.

17. Tune to 6.5 GHz and adjust A1A8R47, BD2 LO, to center the response.

18. Tune to 11.5 GHz and adjust A1A8R16, BD2 HI, to center the response.

19. Tune from 6.2 to 12.3 GHz using 1 MHz tuning resolution. The peak of the response should remain within ± 5 divisions of the center of the display and should remain reasonably centered.

    Readjust the step attenuator if necessary to maintain a smooth curve. If necessary, repeat steps 17 through 19 until the response remains reasonably well centered. The last adjustment should be at 11.5 GHz.

Band 3 Adjustment (12.4 to 18.599 GHz)

20. Tune to 13 GHz and adjust A1A8R41, BD3 LO, to center the response 2.5 divisions to the right of center. The response should be as shown in Figure 5-13.

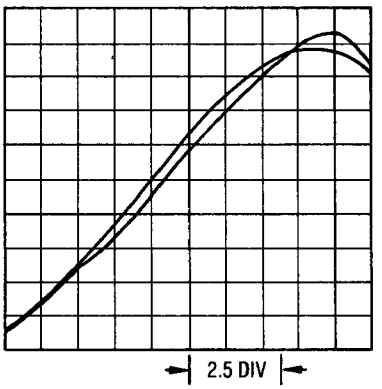


Figure 5-13. Offset YTM Response

5-36A. YTM ADJUSTMENT (cont'd)

Procedure (cont'd)

21. Tune to 16 GHz and adjust A1A8R11, BD3-16, to center the response 2.5 divisions to the right of center.

22. Tune to 18 GHz and wait 10 minutes for the YTM to temperature stabilize. The stabilization is required to minimize the effect of filter drift during the next adjustments.

23. Tune to 17 GHz and adjust A1A8R17, BD3-17, to center the peak of the response.

24. Tune to 18 GHz and adjust A1A8R23, BD3-18, to center the peak of the response.

25. Tune to 18.599 GHz and adjust A1A8R32, BD3-18.6, to center the peak of the response.

26. Tune from 12.4 to 16 GHz using 1 MHz tuning resolution. The peak of the response should always remain at least 4 divisions from the left edge of the display.

    If necessary, repeat steps 20 and 21 to obtain the desired response. The last adjustment should be made at 16 GHz.

27. Tune from 16 to 18 GHz using 1 MHz tuning resolution. The peak of the response should remain within ± 5 divisions of center and remain reasonably centered.

    If necessary, repeat steps 22 and 23 to obtain the desired response. The last adjustment should be made at 18 GHz.

28. Tune from 18 to 18.599 GHz using 1 MHz tuning resolution. The peak of the response should remain within ± 5 divisions of center and reasonably centered.

    If necessary, repeat steps 24 and 25 to obtain the desired response. The last adjustment should be made at 18.599 GHz.

SRD Bias Adjustment

29. Disconnect the signal from A1A8 SENSE test point and disconnect the oscilloscope.

30. Connect the power meter to the Signal Generator's output.

31. Tune to 11.5 GHz and set A1A7R29, PWR, fully counter-clockwise.

32. Reconnect the blue cable to the ALC modulator. Set the Signal Generator's ALC switch to INT and set the range to 0 dB.

33. Set the VERNIER for a −10 dBm reading on the power meter. Adjust A1A6R12, INT OS, if necessary, to bring the power level within +/ 3 dB of −10 dBm.

34. Connect the DVM positive lead to A1A5TP6. Connect the ground lead to A1A7 GND test point. Adjust A1A7R31, BIAS, to maximize the DVM reading.

35. Verify that the voltage at A1A7 BIAS test point is −0.5 ± 0.2 Vdc. If the voltage is not correct, service is required.

36. Disconnect the test equipment.

ADJUSTMENTS

5-37A. Power Clamp Adjustment

Reference Service Sheet 1-A1.

Description The power clamp circuit is adjusted to obtain the maximum power avilable without squegging oscillations. Squegging causes a sudden pwoer output drop of several dB.

Equipment

Power Meter	HP 436A
Power Sensor	HP 8481A

Procedure

1. Connect power meter to RF OUTPUT of the Synthesizer.
2. Set the Synthesizer to 5 GHz and set the ALC swtich to XTAL. Set RF switch OFF. (It will be turned back on in a moment.)
3. Set the A1A5 PWR CLAMP adjustment fully clockwise.
4. Set RF switch ON and adjust the PWR CLAMP control to obtain +15 dBm.
5. Tune the Synthesizer from 2.0 to 6.1 GHz while observing the power meter display. The power should be flat ±1 dB. If a sudden drop of several dB occurs while tuning, continue with this procedure.
6. Turn RF switch OFF and rotate PWR CLAMP clockwise. Turn RF switch ON and rotate PWR CLAMP counterclockwise to obtain the maximum power available at the frequency where the drop off occurred.
7. Rotate the PWR CLAMP to reduce the output by 0.5 dB from the maximum available to insure best stability with time.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5C11	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A5C12	0160-0127	2		CAPACITOR-FXD 1UF +-20% 50VDC CER	28480	0160-0127
A1A5C13	0140-0196	3	1	CAPACITOR-FXD 150PF +-5% 300VDC MICA	72136	DM15F151J0300WV1CR
A1A5C14	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A5C16	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C17	0160-2200	6	1	CAPACITOR-FXD 43PF +-5% 300VDC MICA	28480	0160-2200
A1A5C18	0160-2199	2	1	CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A1A5C19	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C20	0160-0157	8	1	CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A1A5C21	0160-2055	9	4	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A1A5C22	0160-3466	8	2	CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A1A5C23	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C24	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C25	0140-0192	9	1	CAPACITOR-FXD 68PF +-5% 300VDC MICA	72136	DM15E680J0300WV1CR
A1A5C26	0160-3878	6	1	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A1A5C27	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C28	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5C29	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A5CR1	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A1A5CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A1A5CR3	1901-0050	3	32	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR5	1901-1096	9	1	DIODE-PIN	28480	1901-1096
A1A5CR6†	1901-0539	3	3	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A1A5CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A1A5CR8	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A1A5CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5L1	9140-0144	0	6	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A1A5L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A1A5L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A1A5L4†	9100-1623	8	1	INDUCTOR RF-CH-MLD 27UH 5%	28480	9100-1623
A1A5Q1	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q2	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A1A5Q3	1853-0322	9	7	TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q4	1854-0404	0	6	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5Q5	1854-0013	7	1	TRANSISTOR NPN 2N2218A SI TO-5 PD=800MW	04713	2N2218A
A1A5Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5Q7	1854-0712	3	2	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A1A5Q8	1854-0475	5	1	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A1A5Q9	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q10	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q11	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A1A5Q12	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q13	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	01295	2N2946A
A1A5Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A1A5R1	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R2	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R3	0757-0465	6	10	RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A1A5R4	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A1A5R5	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2612-F
A1A5R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A1A5R7	2100-3353	8	5	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A5R8	0757-0442	9	20	RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R10	0698-3432	7	2	RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A1A5R11	0698-3157	3	6	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A1A5R12†	0757-0439	4	2	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6811-F
A1A5R13†	0698-3155	1	4	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A1A5R14	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A1A5R15†	0698-0085	0	5	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F

†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5R16†	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A1A5R17	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A1A5R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A1A5R19	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R20	0757-1094	9	2	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A1A5R21	2100-3274	2	8	RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R23	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R24	0698-0083	8	5	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1961-F
A1A5R25	0757-0438	3	10	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A1A5R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A1A5R27	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3161-F
A1A5R28	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A1A5R29	0698-4414	7	1	RESISTOR 158 1% .125W F TC=0+-100	24546	CT4-1/8-T0-158R-F
A1A5R30	0698-4014	3	1	RESISTOR 787 1% .125W F TC=0+-100	24546	CT4-1/8-T0-787R-F
A1A5R31	0698-3401	0	1	RESISTOR 215 1% .5W F TC=0+-100	28480	0698-3401
A1A5R32	0698-3510	2	1	RESISTOR 453 1% .125W F TC=0+-100	24546	CT4-1/8-T0-453R-F
A1A5R33	0698-3495	2	1	RESISTOR 866 1% .125W F TC=0+-100	24546	CT4-1/8-T0-866R-F
A1A5R34	0757-0346	2	5	RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A1A5R35	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A1A5R36	0757-0401	0	5	RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-T0-101-F
A1A5R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R38	0757-0317	7	2	RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1A5R39	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A1A5R40	0698-0084	9	7	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A1A5R41	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A1A5R42	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A1A5R43	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A1A5R44	0698-3444	1	2	RESISTOR 316 1% .125W F TC=0+-100	24546	CT4-1/8-T0-316R-F
A1A5R45	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R46	0757-0416	7	2	RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A1A5R47	0757-0276	7	1	RESISTOR 61.9 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6192-F
A1A5R48	0757-0290	5	2	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	5033R-1/8-T0-6191-F
A1A5R49	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1961-F
A1A5R50	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A1A5R51	0698-3132	4	2	RESISTOR 261 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2610-F
A1A5R52	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2610-F
A1A5R53	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R54	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R55	0698-3162	0	3	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A1A5R56	0757-0403	2	1	RESISTOR 121 1% .125W F TC=0+-100	24546	CT4-1/8-T0-121R-F
A1A5R57	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A1A5R58	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A1A5R59	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A1A5R60	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R61	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5621-F
A1A5R62	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2872-F
A1A5R63	0698-3236	9	2	RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A5R64	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A1A5R65	0698-3445	2	1	RESISTOR 348 1% .125W F TC=0+-100	24546	CT4-1/8-T0-348R-F
A1A5R66	0698-3236	9		RESISTOR 15K .25% .125W F TC=0+-50	28480	0698-3236
A1A5R67	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A1A5R68	0757-0278	9	1	RESISTOR 1.78K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1781-F
A1A5R69	2100-3351	6	2	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	28480	2100-3351
A1A5R70	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A1A5R71	0698-7576	8	2	RESISTOR 217 .1% .125W F TC=0+-25	19701	5033R-1/8-T9-217R-B
A1A5R72	0757-0402	1	2	RESISTOR 110 1% .125W F TC=0+-100	24546	CT4-1/8-T0-111-F
A1A5R73	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A1A5R74	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1A5R75	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A1A5R76	2100-3274	2		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	28480	2100-3274
A1A5R77	0757-0440	7	2	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A1A5R78	0757-0447	4	1	RESISTOR 16.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1622-F
A1A5R79	0757-0421	4	5	RESISTOR 825 1% .125W F TC=0+-100	24546	CT4-1/8-T0-825R-F

†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A1A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP2				NOT ASSIGNED		
A1A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1A5U1	1826-0486	9	1	IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-P	04713	MC14052BCP
A1A5U2	1826-0501	9	3	ANALOG MULTIPLEXER 6 CHNL 16 -DIP-P	04713	MC14053BCP
A1A5U3	1826-0081	0	5	IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U4	1826-0059	2	6	IC OP AMP GP TO-99 PKG	01295	LM201AL
A1A5U5	1820-0125	1		IC COMPARATOR GP DUAL TO-100 PKG	07263	711HC
A1A5U6	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U7	1826-0081	0		IC OP AMP WB TO-99 PKG	27014	LM318H
A1A5U8	1820-0223	0	7	IC OP AMP GP TO-99 PKG	3L585	CA301AT
A1A5U9	1826-0013	8	1	IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A1A5VR1	1902-0041	4	3	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	07263	1N751A
A1A5VR2	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A1A5VR3	1902-0064	1	1	DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.05%	28480	1902-0064
A1A5VR4	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A1A5VR5	1902-0579	3	1	DIODE-ZNR 5.1V 5% PD=1W IR=10UA	28480	1902-0579
				A1A5 MISCELLANEOUS		
	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
	1480-0073	6	12	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
	4040-0748	3	6	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
	4040-0755	2	1	EXTR-PC BD VIO POLYC .062-IN-BD-THKNS	28480	4040-0755
A1A6†	08672-60197	6	1	BOARD ASSEMBLY, DETECTOR	28480	08672-60197
A1A6C1	0160-0174	9	3	CAPACITOR-FXD .47UF +80-20% 50VDC CER	28480	0160-0174
A1A6C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A6C3	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C4	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1A6C5	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1A6C6	0160-2240	4	1	CAPACITOR-FXD 2PF +-.25PF 500VDC CER	28480	0160-2240
A1A6C7	0160-0174	9		CAPACITOR-FXD .47UF +80-20% 50VDC CER	28480	0160-0174
A1A6C8	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A1A6C9	0160-2207	3	3	CAPACITOR-FXD 300PF +-5% 300VDC MICA	28480	0160-2207
A1A6C10	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084

†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A4	08672-60211	5	1	ASSEMBLY, 20/30 PHASE DETECTOR	28480	08672-60211
A2A4C1	0180-0116	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A2A4C2	0160-6650	8	5	CAPACITOR-FXD .022UF +-1% 50VDC	84411	X463UW-0.022-1%-50VDC
A2A4C3	0180-0197	8	3	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A4C4	0180-0141	2	1	CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D506G050DD2
A2A4C5	0160-4835	7	8	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C6	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A4C7	0160-0161	4	2	CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A2A4C8	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A2A4C9	0160-2290	4	2	CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A2A4C10	0160-4800	6	1	CAPACITOR-FXD 120PF +-5% 100VDC CER	28480	0160-4800
A2A4C11	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C12	0160-2290	4		CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A2A4C13	0160-6650	8		CAPACITOR-FXD .022UF +-1% 50VDC	84411	X463UW-0.022-1%-50VDC
A2A4C14	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C15	0160-6294	6	1	CAPACITOR-FXD 1000PF +-5% 50VDC CER	28480	0160-6294
A2A4C16	0160-3334	9	1	CAPACITOR-FXD .01UF +-10% 50VDC CER	28480	0160-3334
A2A4C17	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C18	0170-0040	9	1	CAPACITOR-FXD .047UF +-10% 200VDC POLYE	56289	292P47392
A2A4C19	0160-6650	8		CAPACITOR-FXD .022UF +-1% 50VDC	84411	X463UW-0.022-1%-50VDC
A2A4C20	0160-6650	8		CAPACITOR-FXD .022UF +-1% 50VDC	84411	X463UW-0.022-1%-50VDC
A2A4C21	0160-4805	1	2	CAPACITOR-FXD 47PF +-5% 100VDC CER 0+-30	28480	0160-4805
A2A4C22	0160-6650	8		CAPACITOR-FXD .022UF +-1% 50VDC	84411	X463UW-0.022-1%-50VDC
A2A4C23	0160-6649	5	3	CAPACITOR-FXD .1UF +-1% 50VDC MET-POLYC	84411	X463UW-0.1-1%-50VDC
A2A4C24	0160-6649	5		CAPACITOR-FXD .1UF +-1% 50VDC MET-POLYC	84411	X463UW-0.1-1%-50VDC
A2A4C25	0160-6649	5		CAPACITOR-FXD .1UF +-1% 50VDC MET-POLYC	84411	X463UW-0.1-1%-50VDC
A2A4C26	0160-0301	4	1	CAPACITOR-FXD .012UF +-10% 200VDC POLYE	28480	0160-0301
A2A4C27	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C28	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C29	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C30	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A4C31	0160-4805	1		CAPACITOR-FXD 47PF +-5% 100VDC CER 0+-30	28480	0160-4805
A2A4CR1	1901-0535	9	4	DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR2	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR3	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4CR4	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A2A4L1	9100-1629	4	2	INDUCTOR RF-CH-MLD 47UH 5%	28480	9100-1629
A2A4L2	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5%	28480	9100-1629
A2A4L3	9140-1191	9	4	INDUCTOR 390 MH +-5%	28480	9140-1191
A2A4L4	9140-1191	9		INDUCTOR 390 MH +-5%	28480	9140-1191
A2A4L5	9140-1191	9		INDUCTOR 390 MH +-5%	28480	9140-1191
A2A4L6	9140-1191	9		INDUCTOR 390 MH +-5%	28480	9140-1191
A2A4Q1	1854-0071	7	1	TRANSISTOR NPN SI TO-92 PD=300MW	2M627	CP4071
A2A4R1	0757-0280	3	6	RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R2	0698-3629	4	1	RESISTOR 270 5% 2W MO TC=0+-200	28480	0698-3629
A2A4R3	0757-1094	9	1	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A2A4R4	0698-3153	9	3	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3831-F
A2A4R5	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3831-F
A2A4R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R7	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R8	0757-0440	7	2	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A2A4R9	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R10	0757-0438	3	5	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A2A4R11	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A2A4R12	0757-0422	5	3	RESISTOR 909 1% .125W F TC=0+-100	24546	CT4-1/8-T0-909R-F
A2A4R13	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	CT4-1/8-T0-909R-F
A2A4R14	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A2A4R15	0698-3160	8	1	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A4R16	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A2A4R17	0757-0467	8	2	RESISTOR 121K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1213-F
A2A4R18	0698-6362	8	4	RESISTOR 1K .1% .125W F TC=0+-25	28480	0698-6362
A2A4R19	0698-6362	8		RESISTOR 1K .1% .125W F TC=0+-25	28480	0698-6362
A2A4R20	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A2A4R21	0757-0401	0	2	RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-T0-101-F
A2A4R22	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R23	0757-0819	4	1	RESISTOR 909 1% .5W F TC=0+-100	28480	0757-0819
A2A4R24	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A2A4R25	0757-0424	7	1	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1101-F
A2A4R26	0698-3443	0	1	RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A2A4R27	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3831-F
A2A4R28	0757-0346	2	7	RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R29	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5621-F
A2A4R30	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	CT4-1/8-T0-909R-F
A2A4R31	0757-0278	9	1	RESISTOR 1.78K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1781-F
A2A4R32	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-T0-101-F
A2A4R33	0698-6362	8		RESISTOR 1K .1% .125W F TC=0+-25	28480	0698-6362
A2A4R34	0698-7394	8	1	RESISTOR 698 .1% .125W F TC=0+-25	19701	5033R-1/8-T9-698R-R
A2A4R35	0698-6362	8		RESISTOR 1K .1% .125W F TC=0+-25	28480	0698-6362
A2A4R36	0757-0467	8		RESISTOR 121K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1213-F
A2A4R37	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A2A4R38	0698-3154	0	1	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A2A4R39	0698-3440	7	1	RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-T0-196R-F
A2A4R40	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R41	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R42	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R43	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R44	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R45	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A2A4R46*	0698-3158	4	1	RESISTOR 23.7K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2372-F
A2A4R47	0698-3441	8	4	RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A2A4R48	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A2A4R49	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A2A4R50	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A2A4TP1	1251-0600	0	4	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A4U1	1820-0429	8	1	IC V RGLTR TO-39	18324	LM309H
A2A4U2	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A4U3	1820-0281	0	1	IC FF TTL J-K M/S PULSE CLEAR DUAL	01295	SN74107N
A2A4U4	1820-1422	3	2	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U5	1826-0783	9	1	IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A2A4U6	1826-0716	8	2	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A2A4U7	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A4U8	1820-1422	3		IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U9	1820-1645	2	1	IC BFR TTL LS BUS QUAD	01295	SN74LS126AN
A2A4U10	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A2A4VR1	1902-3234	3	1	DIODE-ZNR 19.6V 5% DO-35 PD=.4W	28480	1902-3234
	08672-20136	9	1	COVER-PHASE DET	28480	08672-20136
	08672-20211	1	1	BOARD-PHASE DET	28480	08672-20211
	0890-0212	3	1	TUBING-FLEX .032-ID TFE .012-WALL	28480	0890-0212
	1205-0250	9	1	THERMAL LINK SGL TO-5/TO-39-CS	28480	1205-0250
	2200-0101	0	4	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2A5	08672-60145	4	1	ASSEMBLY, 20/30 DIVIDER	28480	08672-60145
A2A5C1	0160-2055	9	12	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A2A5C2	0180-0229	7	4	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5C3	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A2A5C4	0180-2205	3	1	CAPACITOR-FXD .33UF+-10% 35VDC TA	56289	150D334X9035A2
A2A5C5	0160-3466	8	1	CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A3	86701-60098	6	1	M/N PH DET BD AY	28480	86701-60098
A3A1A3C1	0160-4299	7	4	CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C2	0160-0574	3	6	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3C3	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C4	0180-0100	3	1	CAPACITOR-FXD 4.7UF+-10% 35VDC TA	56289	150D475X9035B2
A3A1A3C5	0160-0572	1	2	CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A3A1A3C6	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A3A1A3C7	0160-3876	4	3	CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A1A3C8	0160-3877	5	1	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A1A3C9	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A1A3C10	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3C11	0160-3873	1	2	CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A3A1A3C12	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3C13	0160-3878	6	25	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A3C14	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3C15	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A3C16	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A3C17	0180-0197	8	3	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A3C18	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C19	0180-0291	3	2	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3A1A3C20	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3C21	0160-4299	7		CAPACITOR-FXD 2200PF +-20% 250VDC CER	56289	C067F251F222MS22-CDH
A3A1A3C22	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A1A3J1	1250-0690	6	1	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0690
A3A1A3L1	9100-1641	0	3	INDUCTOR RF-CH-MLD 240UH 5%	28480	9100-1641
A3A1A3L2	9100-2259	8	1	INDUCTOR RF-CH-MLD 1.5UH 10%	28480	9100-2259
A3A1A3L3	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5%	28480	9100-1641
A3A1A3L4	9100-2891	4	9	INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A3L5	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A3L6	9100-2248	5	3	INDUCTOR RF-CH-MLD 120NH 10%	28480	9100-2248
A3A1A3L7	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10%	28480	9100-2248
A3A1A3L8	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10%	28480	9100-2248
A3A1A3MP1	85660-20136	7	1	M/N PHASE DET BD	28480	85660-20136
A3A1A3MP2				NOT ASSIGNED		
A3A1A3MP3	0520-0129	8	13	SCREW-MACH 2-56 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A3MP4	0590-0533	5	15	THREADED INSERT-NUT 2-56 .06-IN-LG SST	28480	0590-0533
A3A1A3MP5	1205-0285	0	6	HEAT SINK SGL DIP	28480	1205-0285
A3A1A3MP6	2190-0014	1	3	WASHER-LK INTL T NO. 2 .089-IN-ID	78189	1902-00-00-2580
A3A1A3MP7	2190-0124	4	9	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A3A1A3MP8	2200-0101	0	4	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A3MP10	2950-0078	9	5	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A1A3MP11				NOT ASSIGNED		
A3A1A3MP12	86701-20101	8	1	CV-PC M/N PH DET	28480	86701-20101
A3A1A3MP13	85660-20068	4	4	GROUND LUG	28480	85660-20068
A3A1A3MP14	86701-00032	2	1	HEATSINK	28480	86701-00032
A3A1A3MP15				NOT ASSIGNED		
A3A1A3MP16	86701-40001	9	3	EXTRACTOR PC	28480	86701-40001
A3A1A3MP17				NOT ASSIGNED		
A3A1A3MP18	8151-0013	4	2	WIRE 22AWG 1X22	28480	8151-0013
A3A1A3Q1	1853-0451	5	4	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A3Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A3Q3	1854-0345	8	6	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A3Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A3R1	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A3R2	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A3R3	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A3R4	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A3R5	0698-7267	4	1	RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A3R6	0757-0401	0	2	RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-T0-101-F
A3A1A3R7	0698-0083	8	2	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1961-F
A3A1A3R8	0698-7192	4	2	RESISTOR 14.7 1% .05W F TC=0+-100	24546	C3-1/8-T0-14R7-F
A3A1A3R9	0757-0280	3	5	RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3A1A3R10	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3A1A3R11	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A3R12	0698-7212	9	5	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A3R13	0698-3157	3	2	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3A1A3R14	0757-0416	7	4	RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A3A1A3R15	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A3A1A3R16	0698-7248	1	7	RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A3R17	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A3R18	0698-7223	2	5	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A3A1A3R19	0698-7256	1	1	RESISTOR 6.81K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6811-F
A3A1A3R20	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A3R21	0698-7220	9	2	RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A3A1A3R22	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A3A1A3R23	0698-7192	4		RESISTOR 14.7 1% .05W F TC=0+-100	24546	C3-1/8-T0-14R7-F
A3A1A3R24	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A3A1A3R25	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A3A1A3R26	0757-0441	8	2	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-8251-F
A3A1A3R27	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-8251-F
A3A1A3R28	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3A1A3R29	0698-3162	0	1	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A3A1A3R30	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1961-F
A3A1A3TP1	1251-0600	0	8	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A3U1	1820-1344	8	1	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A1A3U2	1826-0092	3	1	IC OP AMP GP DUAL TO-99 PKG	28480	1826-0092
A3A1A3U3	1810-0251	3	3	NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U4	1820-1225	4	2	IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U5	1810-0204	6	6	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U6	1820-3126	8	2	IC CNTR ECL HEXADEC SYNCHRO	04713	MC10136P
A3A1A3U7	1820-0802	1	4	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U8	1810-0204	6		NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U9	1820-0806	5	2	IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U10	1820-0820	3	2	IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U11	1810-0204	6		NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U12	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U13	1810-0251	3		NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U14	1820-1225	4		IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U15	1810-0204	6		NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U16	1820-3126	8		IC CNTR ECL HEXADEC SYNCHRO	04713	MC10136P
A3A1A3U17	1810-0251	3		NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0251
A3A1A3U18	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U19	1810-0204	6		NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U20	1820-0806	5		IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U21	1820-0820	3		IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U22	1810-0204	6		NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81-R1K
A3A1A3U23	1820-0802	1		IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U24	0955-0063	0	1	U-WAVE MIXER 500 MHZ MAX	28480	0955-0063
A3A1A3VR1	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A3A1A3W1	86701-60051	1	1	CBL AY IF IN-OUT	28480	86701-60051
A3A1A3W2	85660-60085	9	1	CABLE ASSY	28480	85660-60085
	2190-0112	0	12	WASHER-LK HLCL NO ? .088-IN-ID	28480	2190-0112
	6040-0454	0	2	THERMAL COMPOUND	28480	6040-0454
	7121-4611	2	1	LABEL-INFORMATION .15-IN-WD .6-IN-LG	28480	7121-4611
	86701-64098	4	1	SQ-M/N PH DET BD	28480	86701-64098

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A4	86701-60029	3	1	M/N VCO ASSEMBLY	28480	86701-60029
			1	(INCL. A3A1A4A1, A3A1A4A2)		
A3A1A4	86701-60071	5	1	M/N VCO ASSEMBLY (RESTORED 08672-60029)	28480	86701-60071
				A3A1A4 MISCELLANEOUS		
	0380-0020	0	1	SPACER-RND .25-IN-LG .128-IN-ID	28480	0380-0020
	0520-0128	7	5	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0520-0133	4	2	SCREW-MACH 2-56 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	0510-0003	6	1	THREADED INSERT-NUT 8-32 .094-IN-LG STL	28480	0510-0003
	2190-0045	8	4	WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0045
	3050-0672	2	1	WASHER-SHLDR NO. 4 .118-IN-ID .25-IN-OD	28480	3050-0672
	86701-20046	0	1	PROBE	28480	86701-20046
	86701-20047	1	1	SUPPORT, RESONATOR	28480	86701-20047
A3A1A4A1				VCO RESONATOR ASSEMBLY (NSR, P/O A3A1A4)		
A3A1A4A2	86701-60027	1	1	BOARD ASSEMBLY, M/N VCO	28480	86701-60027
A3A1A4A2C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C3	0160-3879	7	2	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A4A2C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C5	0180-0116	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A3A1A4A2C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C8	0160-3873	1		CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A3A1A4A2C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A4A2C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A1A4A2C11	0180-2161	0	1	CAPACITOR-FXD .75UF+-10% 50VDC TA	56289	150D754X9050A2
A3A1A4A2L1	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A4A2L2	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A4A2L3	86701-20051	7	1	INDUCTOR	28480	86701-20051
A3A1A4A2L4	9140-0158	6	1	INDUCTOR RF-CH-MLD 1UH 10%	28480	9140-0158
A3A1A4A2Q1	1854-0610	0	1	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A3A1A4A2Q2	1854-0686	0	2	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A3A1A4A2R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3A1A4A2R2	0698-7219	6	1	RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A3A1A4A2R3	0698-7193	5	1	RESISTOR 16.2 1% .05W F TC=0+-100	24546	C3-1/8-T0-16R2-F
A3A1A4A2R4	0698-3154	0	6	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4221-F
A3A1A4A2R5	0757-0428	1	2	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1621-F
A3A1A4A2R6	0698-7262	9	1	RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1212-F
A3A1A4A2R7	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1621-F
A3A1A4A2R8	0698-7254	9	1	RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5621-F
A3A1A4A2R9	0698-7205	0	2	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A1A4A2R10	0698-7265	2	1	RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A3A1A4A2R11	0698-7250	5	1	RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3831-F
A3A1A4A2R12	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-T0-101-F
A3A1A4A2R13	0757-0400	9	1	RESISTOR 90.9 1% .125W F TC=0+-100	24546	CT4-1/8-T0-90R9-F
A3A1A4A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A1A4A2W1	86701-60058	8	1	CABLE ASSEMBLY, VCO OUTPUT	28480	86701-60058
A3A1A4A2W2	86701-20050	6	1	CABLE, S/R JUMPER	28480	86701-20050
				A3A1A4A2 MISCELLANEOUS		
	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
	86701-20052	8	2	SPACER, INSULATOR	28480	86701-20052
A3A1A5	86701-60097	5	1	M/N OUTPUT BD AY	28480	86701-60097
A3A1A5C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C3	0160-3874	2	1	CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A3A1A5C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C6	0160-4383	0	1	CAPACITOR-FXD 6.8PF +-.5PF 200VDC CER	20932	5024E0200RD689D
A3A1A5C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C9	0160-4491	1	1	CAPACITOR-FXD 8.2PF +-.5PF 200VDC CER	28480	0160-4491
A3A1A5C10	0160-4490	0	1	CAPACITOR-FXD 1.8PF +-.25PF 200VDC CER	28480	0160-4490
A3A1A5C11				NOT ASSIGNED		
A3A1A5C12	0160-2261	9	1	CAPACITOR-FXD 15PF +-5% 500VDC CER 0+-30	28480	0160-2261
A3A1A5C13	0160-2290	4	2	CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A3A1A5C14	0160-2290	4		CAPACITOR-FXD .15UF +-10% 80VDC POLYE	28480	0160-2290
A3A1A5C15	0160-0196	5	1	CAPACITOR-FXD 24PF +-5% 300VDC MICA	28480	0160-0196

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5C16	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C18	0160-4389	6	1	CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A3A1A5C19	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A1A5C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C22	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C23	0160-4351	2	1	CAPACITOR-FDTHRU 1000PF 20% 200V CER	28480	0160-4351
A3A1A5C24	0160-0161	4	2	CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A5C25	0160-0153	4	1	CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A3A1A5C26	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A3A1A5C27	0160-3534	1	1	CAPACITOR-FXD 510PF +-5% 100VDC MICA	28480	0160-3534
A3A1A5C28	0160-0298	8	1	CAPACITOR-FXD 1500PF +-10% 200VDC POLYE	28480	0160-0298
A3A1A5C29	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A5C30	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C31	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A3A1A5C32				NOT ASSIGNED		
A3A1A5C33	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C34	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C35	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C36	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3A1A5C37	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A1A5C38	0180-0630	4	1	CAPACITOR-FXD 4.7UF+-20% 50VDC TA	28480	0180-0630
A3A1A5CR1				NOT ASSIGNED		
A3A1A5CR2				NOT ASSIGNED		
A3A1A5CR3	1901-0040	1	2	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A1A5CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A1A5CR5	1901-1098	1	2	DIODE-SWITCHING 1N4150 50V 200MA 4NS	15818	1N4150
A3A1A5CR6	1901-0518	8	1	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A1A5CR7	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	15818	1N4150
A3A1A5J1	1250-0657	5	2	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0657
A3A1A5J2	1250-0657	5		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	28480	1250-0657
A3A1A5J3	1250-0257	1	1	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A3A1A5L1	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A5L2	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A5L3	9135-0073	3	2	INDUCTOR RF-CH-MLD 47NH 6.596%	28480	9135-0073
A3A1A5L4	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A5L5				NOT ASSIGNED		
A3A1A5L6	9100-1634	1	1	INDUCTOR RF-CH-MLD 75UH 5%	28480	9100-1634
A3A1A5L7	9100-1635	2	1	INDUCTOR RF-CH-MLD 91UH 5%	28480	9100-1635
A3A1A5L8	9100-1620	5	1	INDUCTOR RF-CH-MLD 15UH 10%	28480	9100-1620
A3A1A5L9	9140-0210	1	1	INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3A1A5L10	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A5L11	9100-2891	4		INDUCTOR RF-CH-MLD 50NH 10%	28480	9100-2891
A3A1A5L12	9135-0079	9	1	INDUCTOR 100NH 5.5% 2.60-MMX6.6LG-MM	28480	9135-0079
A3A1A5L13	9135-0073	3		INDUCTOR RF-CH-MLD 47NH 6.596%	28480	9135-0073
A3A1A5L14	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A3A1A5L15	9100-1641	0		INDUCTOR RF-CH-MLD 240UH 5%	28480	9100-1641
A3A1A5MP1				NOT ASSIGNED		
A3A1A5MP2				NOT ASSIGNED		
A3A1A5MP3	2190-0009	4	1	WASHER-LK INTL T NO. 8 .168-IN-ID	28480	2190-0009
A3A1A5MP4	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A3A1A5MP5	2200-0101	0		SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A5MP6	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	28480	2580-0002
A3A1A5MP7	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A1A5MP8	3050-0082	8	1	WASHER-FL NM NO. 4 .116-IN-ID .188-IN-OD	28480	3050-0082
A3A1A5MP9	4330-0145	9	1	INSULATOR-BEAD GLASS	28480	4330-0145
A3A1A5MP10	8151-0013	4		WIRE 22AWG 1X22	28480	8151-0013
A3A1A5MP11	86701-20100	7	1	COV-PC M/N OUT	28480	86701-20100
A3A1A5MP12	85660-20068	4		GROUND LUG	28480	85660-20068
A3A1A5MP13	86701-40001	9		EXTRACTOR PC	28480	86701-40001
A3A1A5MP14	2200-0103	2	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A5MP15	0520-0128	7		SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5MP16	0590-0533	5		THREADED INSERT-NUT 2-56 .06-IN-LG SST	28480	0590-0533
A3A1A5MP17	1205-0285	0		HEAT SINK SGL DIP	28480	1205-0285
A3A1A5MP18	85660-00065	9	1	HEAT SINK	28480	85660-00065
A3A1A5MP19	2190-0112	0		WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0112
A3A1A5MP20	6040-0454	0		THERMAL COMPOUND	28480	6040-0454
A3A1A5Q1	1854-0546	1	2	TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q5	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A3A1A5Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q8	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A5Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A1A5Q10	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A3A1A5R1	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A5R2	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A5R3	0698-7243	6	4	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A3A1A5R4	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A1A5R5	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A3A1A5R6	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A5R7	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A3A1A5R8	0757-0316	6	1	RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A3A1A5R9	0698-7221	0	2	RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-T0-237R-F
A3A1A5R10	0698-7188	8	4	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A1A5R11	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A5R12	0757-0394	0	1	RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A3A1A5R13	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A5R14	0757-1094	9	4	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A3A1A5R15	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A3A1A5R16	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A3A1A5R17	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1471-F
A3A1A5R18	0698-7260	7	2	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A3A1A5R19	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A5R20	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A3A1A5R21	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A3A1A5R22	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A1A5R23	0698-7229	8	3	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A1A5R24	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A1A5R25	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-T0-237R-F
A3A1A5R26	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A3A1A5R27	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A1A5R28	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A1A5R29	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A3A1A5R30	0698-7195	7	1	RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-T0-19R6-F
A3A1A5R31	0698-7227	6	1	RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-T0-422R-F
A3A1A5R32	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A1A5R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3A1A5R34	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3161-F
A3A1A5R35	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A3A1A5R36	0698-7210	7	1	RESISTOR 82.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-82R5-F
A3A1A5R37	0698-7257	2	1	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A3A1A5R38	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A3A1A5R39	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A1A5R40	0757-0440	7	1	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A3A1A5R41	0757-0199	3	1	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3A1A5R42	0698-7263	0	1	RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1332-F
A3A1A5R43	0698-7277	6	1	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A3A1A5R44	0698-0024	7	1	RESISTOR 2.61K 1% .5W F TC=0+-100	28480	0698-0024
A3A1A5R45	0757-0442	9	1	RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3A1A5R46	0757-0447	4	1	RESISTOR 16.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1622-F
A3A1A5R47	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A1A5R48	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5U1	1826-0059	2	1	IC OP AMP GP TO-99 PKG	01295	LM201AL
A3A1A5U2	1820-3485	2	1	IC PRESCR ECL	04713	MC12090L
A3A1A5VR1	1902-3070	5	2	DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5VR2	1902-3070	5		DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5W1	85660-60103	2	1	JUMPER WIRE AY	28480	85660-60103

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A5	08673-60229	6	1	DIGITAL-TO-ANALOG CONVERTER ASSEMBLY	28480	08673-60229
A3A5C1	0180-2141	6	1	CAPACITOR-FXD 3.3UF+-10% 50VDC TA	12344	T110B335K050AS
A3A5C2	0160-3879	7	6	CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5C3	0180-0229	7	1	CAPACITOR-FXD 33UF+-10% 10VDC TA	K7253	TAAB33K10RX
A3A5C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5C5	0180-0116	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	K7253	TAAB6R8K35RX
A3A5C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5C7	0180-3721	0	1	CAPACITOR-FXD 22UF+-20% 50VDC AL	90494	KM50T22RM6.3X16LL
A3A5C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5C9	0180-1731	8	1	CAPACITOR-FXD 4.7UF+-10% 50VDC TA	12344	T110B475K050AS
A3A5C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	06383	FD12X7R2A103M
A3A5L1	9100-1631	8	1	INDUCTOR RF-CH-MLD 56UH +-5%	99800	1537-64
A3A5L2	9100-1641	0	2	INDUCTOR RF-CH-MLD 240UH +-5%	99800	1537-94
A3A5L3	9100-1641	0		INDUCTOR RF-CH-MLD 240UH +-5%	99800	1537-94
A3A5MP1	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	46384	KFS2-440
A3A5MP2	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A5MP3	5000-9043	6	1	PIN-PC BOARD EXTRACTOR	28480	5000-9043
A3A5MP4	5040-6843	2	1	EXTRACTOR-PC BOARD	28480	5040-6843
A3A5Q1	1854-0474	4	1	TRANSISTOR NPN SI PD=310MW FT=100MHZ	04713	2N5551
A3A5Q2	1853-0451	5	3	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q3	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5Q4	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A5R1	0698-3132	4	1	RESISTOR 261 1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R2	0699-0476	5	1	RESISTOR 100 .1% .1W F TC=0+-10	28480	0699-0476
A3A5R3	0698-3442	9	1	RESISTOR 237 1% .125W TF TC=0+-100	K8479	H8
A3A5R4	0699-2410	1	1	RESISTOR 250 .1% .125W TF TC=0+-5	19701	5033Z
A3A5R5	0699-0078	3	1	RESISTOR 2.1K .1% .1W F TC=0+-10	28480	0699-0078
A3A5R6	0698-3150	6	2	RESISTOR 2.37K 1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R7	0698-3150	6		RESISTOR 2.37K 1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R8	2100-4215	3	1	RESISTOR-TRMR 100 10% TF SIDE-ADJ 25-TRN	18612	1202Y100R10
A3A5R9	0699-0236	5	1	RESISTOR 2.5K .1% .1W F TC=0+-5	28480	0699-0236
A3A5R10	0757-0401	0	1	RESISTOR 100 1% .125W TF TC=0+-100	91637	CMF-55-1, T-1
A3A5R11	0757-0465	6	2	RESISTOR 100K 1% .125W TF TC=0+-100	12498	CT4
A3A5R12	0757-0317	7	1	RESISTOR 1.33K 1% .125W TF TC=0+-100	K8479	H8
A3A5R13	0698-3136	8	1	RESISTOR 17.8K 1% .125W TF TC=0+-100	06424	NK4H
A3A5R14	0757-0438	3	1	RESISTOR 5.11K 1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R15	2100-3122	9	1	RESISTOR-TRMR 100 10% TKF SIDE-ADJ	09969	2101P
A3A5R16	0757-0465	6		RESISTOR 100K 1% .125W TF TC=0+-100	12498	CT4
A3A5R17	0699-0072	7	1	RESISTOR 6.81M 1% .125W F TC=0+-150	28480	0699-0072
A3A5R18	0699-0642	7	1	RESISTOR 10K .1% .1W F TC=0+-5	28480	0699-0642
A3A5R19	0757-1094	9	1	RESISTOR 1.47K 1% .125W TF TC=0+-100	91637	CMF-55-1, T-1
A3A5R20	0698-3455	4	1	RESISTOR 261K 1% .125W TF TC=0+-100	K8479	H8
A3A5R21	0757-0421	4	2	RESISTOR 825 1% .125W TF TC=0+-100	19701	SFR25H
A3A5R22	0698-4037	0	1	RESISTOR 46.4 1% .125W TF TC=0+-100	D8439	MK2
A3A5R23	0757-0290	5	1	RESISTOR 6.19K 1% .125W TF TC=0+-100	K8479	H8
A3A5R24	0757-0818	3	1	RESISTOR 825 1% .5W TF TC=0+-100	K8479	H2
A3A5R25	0698-3408	7	1	RESISTOR 2.15K 1% .5W TF TC=0+-100	19701	5053R
A3A5R26	0698-3454	3	1	RESISTOR 215K 1% .125W TF TC=0+-100	K8479	H8
A3A5R27	0757-0346	2	1	RESISTOR 10 1% .125W TF TC=0+-100	06424	NK4H
A3A5R28	0757-0421	4		RESISTOR 825 1% .125W TF TC=0+-100	19701	SFR25H
A3A5R29	0757-0158	4	1	RESISTOR 619 1% .5W TF TC=0+-100	91637	CMF-65-2
A3A5TP1	1251-0600	0	5	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A5U1	1826-0607	6	1	IC-REGULATOR 7815A	28480	1826-0607
A3A5U2	1826-1590	8	1	IC OP AMP PRCN QUAD 14-DIP-P PKG	28480	1826-1590
A3A5U3	08673-80098	9	2	IC EPROM 256K D27256	28480	08673-80098
A3A5U4	08673-80098	9		IC EPROM 256K D27256	28480	08673-80098
A3A5U5	1826-1386	0	1	D/A 12-BIT 18-PLASTIC CMOS	24355	AD11/548

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A5VR1	1902-0692	1	1	DIODE-ZNR 6.3V 1% DO-7 PD=.4W TC=+.001%	28480	1902-0692
A3A5VR2	1902-0958	2	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A3A5VR3	1902-0085	6	1	DIODE-ZNR 27V 5% PD=1W IR=5UA	28480	1902-0085

See introduction to this section for ordering information
*Indicates factory selected value
†Backdating information in Section VII

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				ILLUSTRATED PARTS BREAKDOWN		
1	5001-0439	8	2	SIDE TRIM, FRONT FRAME W/O FRONT HANDLE	28480	5001-0439
2	5041-6820	7	2	CAP, REAR, HANDLE	28480	5041-6820
3	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	28480	0515-1132
4	5060-9938	4	2	COVER, PERFORATED SIDE	28480	5060-9938
5	86701-00062	8	4	STRUT, LOWER LEFT	28480	86701-00062
	86701-00063	9	1	STRUT, LOWER RIGHT	28480	86701-00063
	5021-5883	8	2	STRUT, UPPER	28480	5021-5883
	0515-0896	5	12	SCREW-MACH M4 X 0.7 10MM-LG	28480	0515-0896
	0515-1331	5	8	SCREW-METRIC SPECIALTY M4 X 0.7 THD; 6	28480	0515-1331
6	86701-20092	6	1	FRAME, REAR	28480	86701-20092
7	5040-7221	2	4	STANDOFF, REAR PANEL	28480	5040-7221
	0515-1232	5	1	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	28480	0515-1232
8	0570-1171	7	2	CAPTIVE SCREW (USE WITH TOP & BOTTOM COVERS; SEE ALSO ITEM 9)	00000	ORDER BY DESCRIPTION
9	0510-0043	4	2	CLIP (USE WITH TOP & BOTTOM COVERS; SEE ALSO ITEM 8)	28480	0510-0043
10	5060-9836	1	1	COVER, TOP	28480	5060-9836
11	5040-7202	9	1	TRIM, TOP	28480	5040-7202
12	5001-8232	5	1	GUSSET, SIDE	28480	5001-8232
13	5060-9805	4	1	STRAP, HANDLE 21"	28480	5060-9805
14	5021-5803	2	1	FRAME, FRONT	28480	5021-5803
15	86701-20001	7	1	DIVIDER FRAME, FRONT	28480	86701-20001
16	5040-7201	8	4	FOOT, FULL 1/2 MOD	28480	5040-7201
17	5061-9448	3	1	COVER, BOTTOM	28480	5061-9448
18	1460-1345	5	2	TILT STAND SST (TILT STAND)	28480	1460-1345
19	5041-6819	4	2	CAP, FRONT, HANDLE	28480	5041-6819

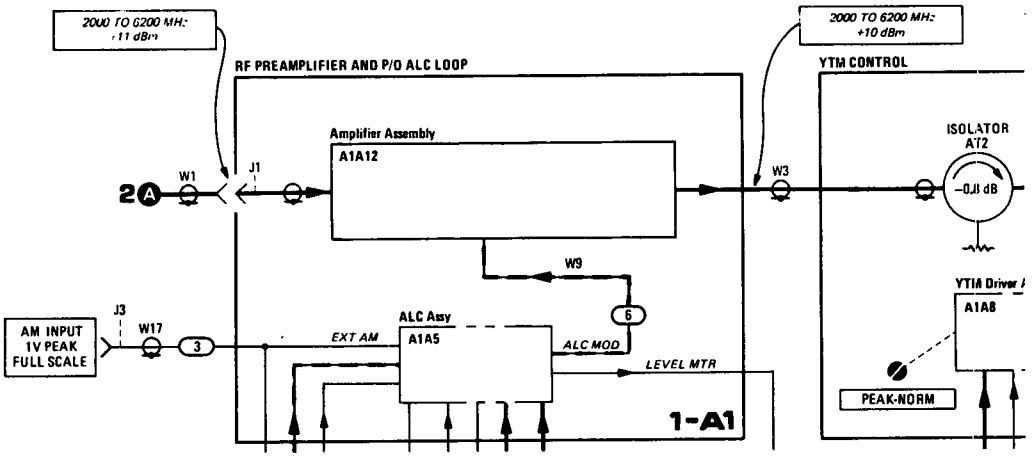


Figure 8-24A. P/O A1 RF Output Assembly Troubleshooting Block Diagram

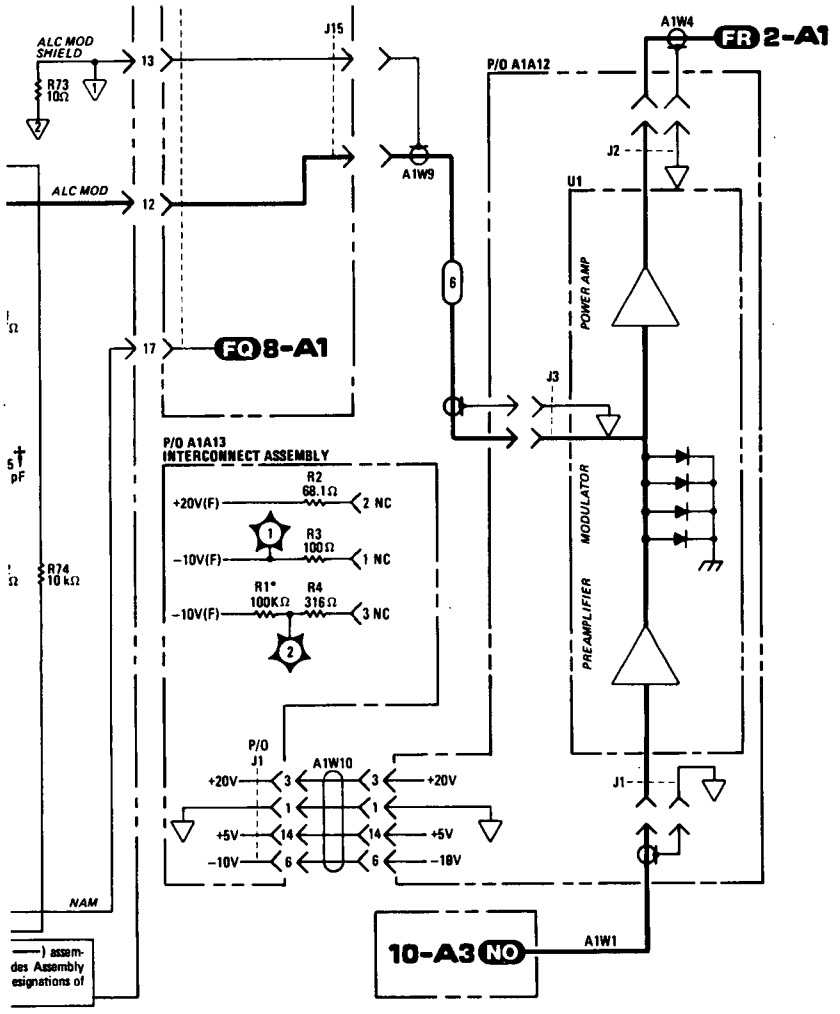


Figure 8-27A. P/O RF Preamplifier and P/O ALC Loop Schematic

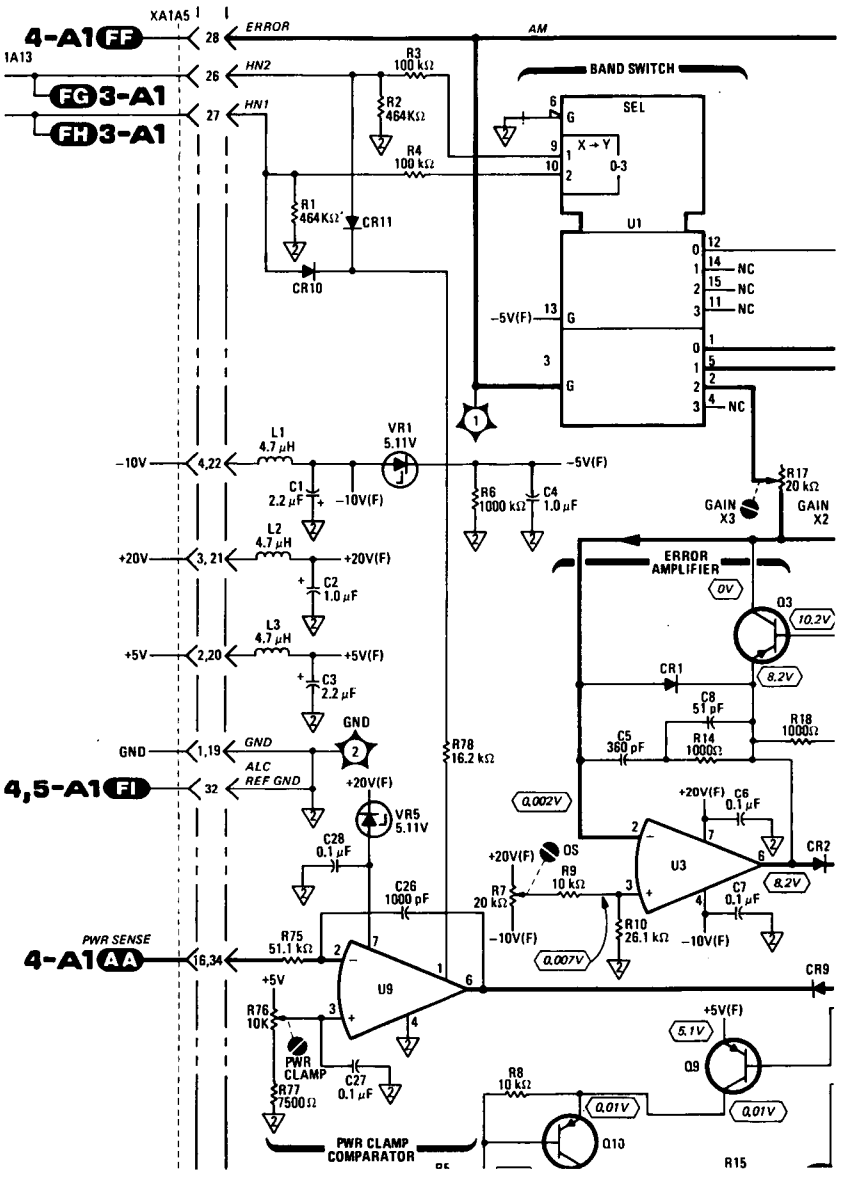


Figure 8-27B. P/O RF Preamplifier and P/O ALC Loop Schematic

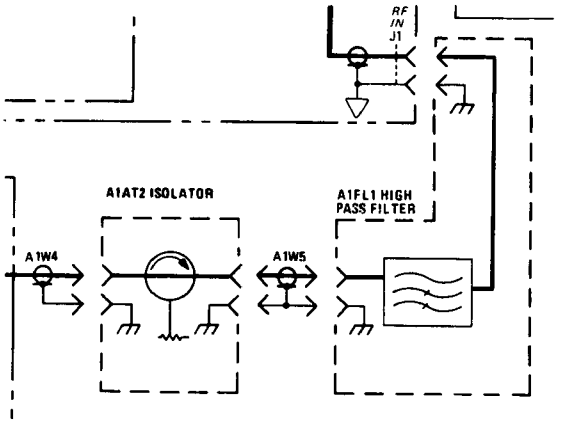
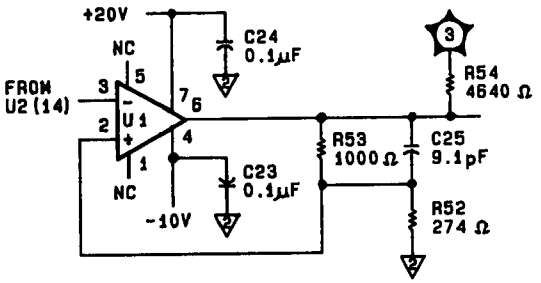


Figure 8-31A. P/O YTO Control Schematic Diagram



P/O Figure 8-37. P/O ALC Loop Schematic

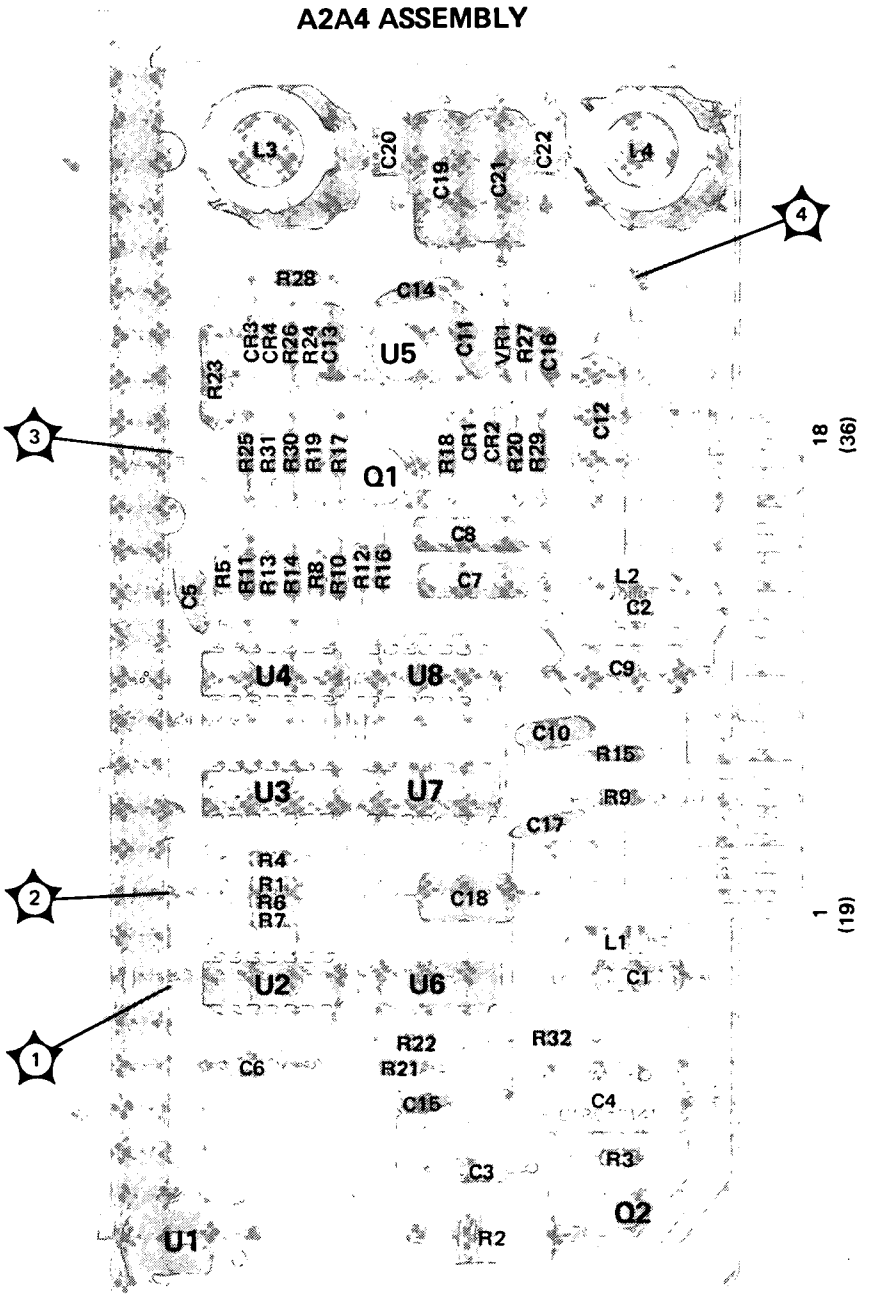


Figure 8-54. A2A4 20/30 Phase Detector Assembly Component and Test Point Location

Revised Material for Service Sheet 2-A2
(Errata)

SERVICE SHEET 6-A3

DIGITAL TO ANALOG CONVERTER ASSEMBLY

TROUBLESHOOTING HELP: In addition to this service sheet refer to:

Overall Functional Block Diagram ..... Service Sheet 1
A3 Assembly Troubleshooting Block Diagram ..... Service Sheet 2
Motherboard Wiring ..... Pages 8-111, 113, and 115 (foldout pages)
Interior Views ..... Pages 8-117, 119, and 121 (foldout pages)
Replaceable Parts List ..... Section VI
Performance Tests ..... Section IV
Post Repair Adjustments ..... Section V

PRINCIPLES OF OPERATION

General

The YTO DAC board, A3A5, generates a DC voltage proportional to the output frequency of the Signal Generator. This voltage is generated from digital information sent to the A3A5 board from the controller section. This voltage tunes the YIG Tuned Oscillator to within 50 MHz of the desired frequency. The Signal Generator's phase-locked loops then lock the YTO to the exact frequency.

The YTO DAC board has four basic sections: (1) the BCD-to-binary converter (2) the voltage reference (3) the digital-to-analog converter (4) the summing amplifier.

Detailed Discussion

BCD-to-Binary Converter. The output voltage of the YTO DAC board is controlled by the 14 digital control lines that come onto the board from the controller section. These lines are labeled DAC 1 MHz through DAC 4800 MHz on the schematic. Each line is labeled to reflect the change in output frequency that occurs when it changes state. These lines are weighted in a binary coded decimal (BCD) format. The BCD data is converted to binary format by U3 and U4. U3 and U4 are 256K EPROMs which are used as look-up tables. The BCD lines (DAC 1 MHz - DAC 4800 MHz) are input to U3 and U4 at the address input ports. The binary outputs (B2 through B4096) are connected to the data bus. Each BCD input to U3 and U4 creates a unique set of binary data on the output data lines.

Voltage Reference. The voltage reference generates a stable voltage on which to base the output voltage of the board. This is derived from VR1, a 6.3V temperature compensated Zener diode. U2B and R1 through R5 are used to establish a stable Q-point for VR1. U2B, R4, and R5 generate a fixed voltage of -7.05V at pin 7 of U2B. This, in conjunction with R2, ensures that the current through VR1 is fixed at 7.5 mA. U2A is a buffer for VR1. U2A provides a buffered -6.3V at the voltage reference input port of U5.

Digital-to-Analog Converter. U5 is a CMOS DAC that consists of a resistor network and a series of CMOS switches controlled by the 12 digital inputs (B2 to B4096). The internal switches adjust the resistance seen by the input of U2C, thereby controlling the gain of U2C. This creates a voltage at pin 8 of U2C that is proportional to the digital data input.

Summing Amplifier. The summing amplifier performs four functions. (1) It amplifies the DAC output voltage, (2) sums in an offset voltage, (3) sums the LSB signal (DAC 1 MHz) into the output voltage, and (4) filters out noise from the DAC and the voltage reference.

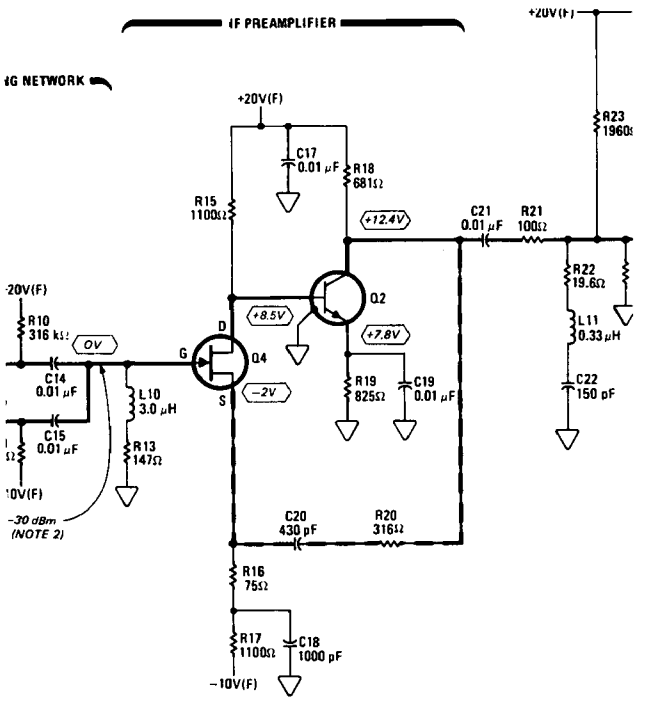
The overall gain of the amp is set by R8, R9, and R18. R8 is a gain adjustment used to set the output voltage of A3A5 to -3V/GHz. R14, R15, and R16 are used to adjust the offset of the overall circuit so that a frequency of 0.0 GHz will result in an output voltage of exactly 0.0V.

R10, R11, R12, and R13 sum the least significant bit from the controller, (DAC 1 MHz), directly into the output amplifier. This is done to achieve 1 MHz resolution at the output of A3A5. DAC U5 has only twelve data input lines, and therefore can switch in only 2 MHz increments. 1 MHz resolution is achieved by weighting the voltage on the DAC 1 MHz to cause a voltage change of 3 mV, and then summing this voltage directly into the output.

Q1, Q2, R20, and C1 form a switchable filter in the summing amp. This filter operates as follows: In normal operation, the current into the base of Q3 is very small. The current through R20 is also very small. The voltage drop across R20 is about 50 mV, so the base-emitter voltages of Q1 and Q2 are not enough to bias them on. R20 and C1 therefore form a low pass filter that attenuates high frequency noise. This filter, in conjunction with the other elements in the summing amplifier's feedback path, gives the summing amplifier a bandwidth of about 150 Hz.

A 150 Hz bandwidth is too narrow for the rapid voltage changes the board must produce during frequency changes. Q1 and Q2 are therefore used to bypass the filter during frequency transitions. A voltage swing at the summing amplifier input will produce a large voltage change at the output of U2D. This will increase the base-emitter voltage of either Q1 or Q2. One of the transistors will turn on, charging C1 up quickly. When the output voltage nears its desired value, the base-emitter voltage will drop causing the transistors to turn off.

R17 and R22 improve the summing amplifier's response to frequency changes. Without R17, U2D would introduce a low frequency pole of about 1 Hz into the open loop response of the circuit. R17 moves the frequency of this pole into the kilohertz range. The low pass filter (R20 and C1) also introduces a 1 Hz pole into the frequency response. R22 adds a zero at 1 kHz to improve the phase margin of the loop. Without this compensation, the summing amplifier would (1) ring after frequency changes, and (2) exhibit peaking, which would appear as a spurious signal at the output of the Signal Generator.



P/O Figure 8-113. YTO Sampler Assembly Schematic Diagram

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